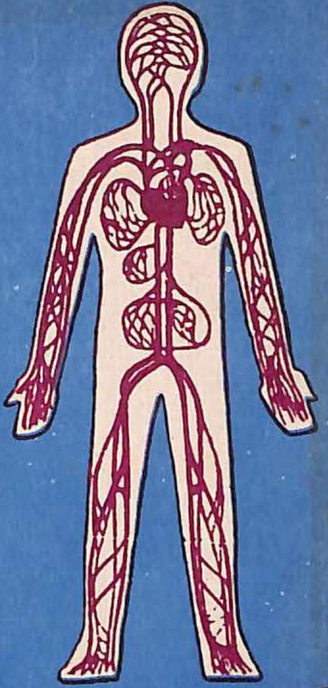
Workbook to SCIENCE



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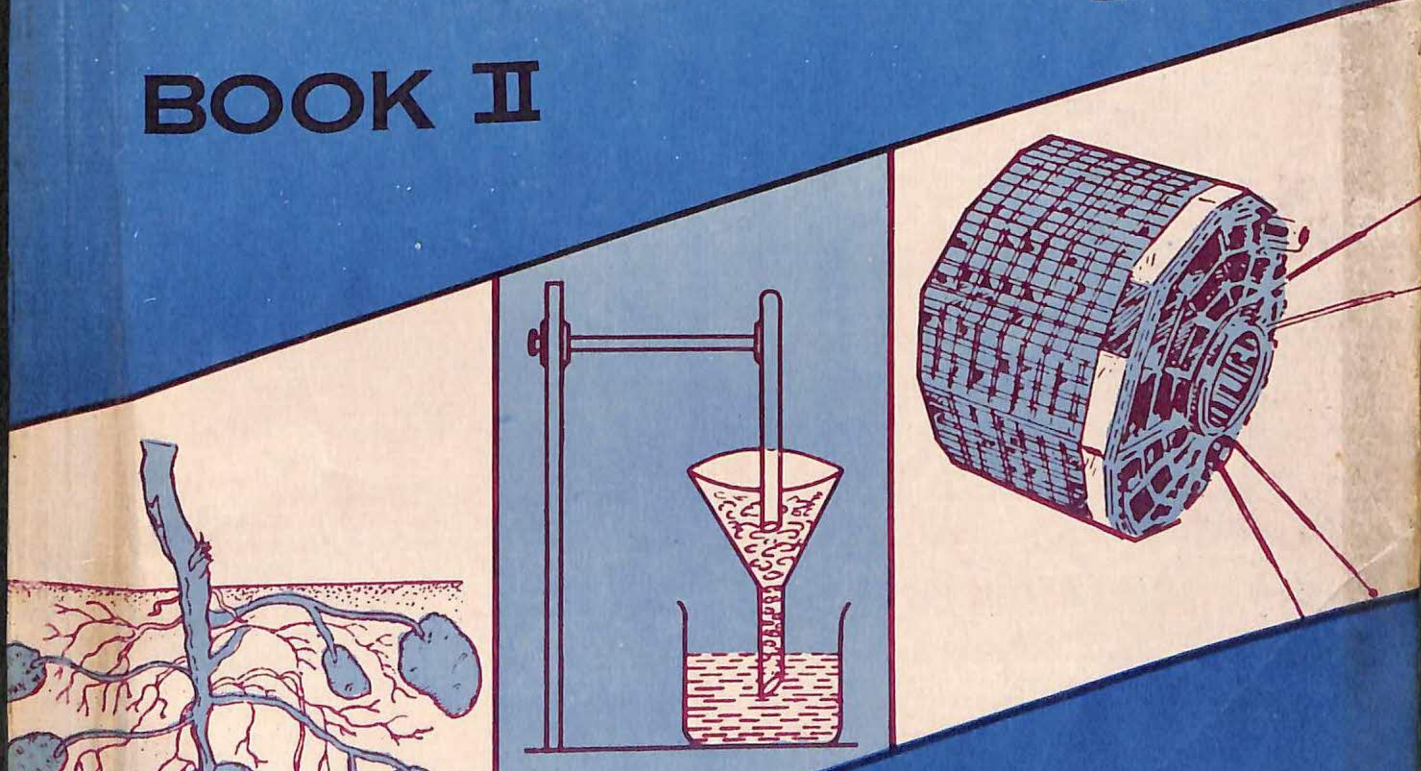

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WORKBOOK TO SCIENCE

PART II FOR CLASS VII

Based on the revised syllabus of Integrated Science of N.C.E.R.T. for Middle Classes under the New Education Policy.

WORKBOOK TO SCIENCE

PART II

(For Class VII)

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THIS WORKBOOK BELONGS TO

NAME..

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PREFACE

This workbook has been prepared strictly according to the Science syllabus for Class VII under the New Education Policy of Indian Schools. It follows the NCERT textbook chapterwise and hence will prove invaluable to students of Class VII. The questions,which are probing and challenging, would help the student to thoroughly understand the concepts dealt with in the textbook. The exercises would give students the much needed practice in the skills of collecting data and applying the knowledge gained to everyday situations and in this way, further reinforce their command of the subject.

The answers as filled in by the students will enable the teachers to gauge and evaluate the student's progress towards specific goals of achievement, i.e. their ability to express their knowledge, the extent of their understanding of the science vocabulary used in the text, their mastery of facts, their proficiency in using their freshly acquired skills, to identify, think and answer questions.

The authors hope that this book will be able to create in the minds of the students an active interest in the study of Science.

There is always scope for improvement. Such improvements depend upon the suggestions of students, parents and classroom teachers. Their comments are most welcome.

We are thankful to the publishers M/s. Pitambar Publishing Company for bringing out this book in the shortest possible time.

—Authors

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CHAPTER 1

STATES OF MATTER

Substances made up of tiny particles are called molecules. The size of molecules is extremely small. Molecules are tightly packed in solids, loosely in liquids and very loosely in gases. Some solids are plastic in nature, some are elastic and some are brittle in nature. Chemical reactions are of two types (A) Decomposition and (B) Combination.

1. Fill in the blanks:

(a) Substances are made up of tiny particles called ....

(b) A molecule is made up of two or......................than two ....

(c) Movement of molecules from region of higher concentration to the region of...........................concentration is called ....

(d) Movement of water from region of higher water concentration to the region of lower......................concentration is called.......................

(e) Molecules have much .... and they get separated widely from one another.

(f) Movement of molecules at random is called.....................................

(g) The property of a substance to........................its ....after the force ceases to act on it is called ....

(h) Substances which break on applying force are called..........................

(i) Chemical reactions in which two or more substances combine together to form a new substance are known as.......................

(j) Chemical reactions in which two or more new substances are obtained from one substance, are called ....

2. What is the arrangement of molecules:

(i) In solids..

....

(ii) In liquids..

....

(iii) In gases..

....

3. Answer briefly:

(a) Why do solids have a fixed shade?

....

(b) Why do gases and liquids not have a fixed shape?

....

(c) Why do gases can be easily compressed?

....

(d) Why do solids are not easily compressed?

....

(e) Why do solids and liquids have an open surface while gases do not?

....

4. State whether the following statements are true or false:

(a) Molecules attract one another.
(b) Diffusion can take place only in gases.
(c) Gases have a definite shape but no definite volume.
(d) Molecules in a solid remain still in their position.
(e) Diffusion is fastest among solid molecules.

☐ ☐

CHAPTER 2

ELEMENTS, COMPOUNDS AND MIXTURES

There is a large variety of things all around us. They are all made up of matter e.g., air, water, animals, plants, planets etc. Even we are made up of matter. In other words, anything which occupies space and has mass is called *matter*. Substances exist in three forms : (i) Elements (ii) Compounds (iii) Mixtures.

Atoms can neither be created nor destroyed in a chemical reaction. During chemical reactions, the masses of reactants and the reaction products remain the same. Chemical elements are represented by their symbols. The molecules of substances are represented by their chemical formula.

The ability of an atom of a chemical element to unite with a definite number of atoms of other elements is known as valency. The magnitude of valency is expressed by a whole number.

The mode of representing a chemical reaction with the help of formulae is called chemical equation. Chemical equations are written in the form of mathematical equations. This represents reactants and the reaction products by using symbols and formula. This also represents the amount of reactants and reaction products in the form of mass or volume.

1. **Define the following:**

(i) Element..

(ii) Symbol...

(iii) Compound...

(iv) Mixtures..

(v) Atomic mass..

2. **Give the symbols of the following elements:**

(i) Sulphur (ii) Calcium (iii) Copper (iv) Magnesium (v) Iron

3. **Give the Latin names and symbols of the following elements:**

Element	*Latin Name*	*Symbol*
(i) Lead	....	....
(ii) Silver	....	....
(iii) Iron	....	....

(iv) Sodium ....

(v) Potassium ....

4. (a) **Who formulated the atomic theory?**

....

(b) **What does the atomic theory state?**

....

....

....

....

5. (a) **Of what atoms are the molecules of the following substances composed?**

(i) Mercuric Oxide :..

(ii) Water :..

(iii) Iron Sulphide :..

(iv) Copper Oxide :..

(v) Iron Oxide :...

(b) **How many times is an atom of magnesium heavier than**

(a) an atom of carbon.

....

(b) an atom of hydrogen.

....

(c) Graphite and Diamond are made up of the same type of atoms; what is responsible for their characteristic properties?

....

....

6. (a) **On heating red lead, oxygen and a yellow powder called lead oxide were obtained. Represent this reaction schematically.**

....

(b) To which type of reactions do the following belong:

(i) On heating silver oxide, silver and oxygen are formed.

....

(ii) On heating baking soda, water, carbon dioxide and washing soda are formed.

....

(iii) Decomposition of water into hydrogen and oxygen—when an electric current is passed.

....

(iv) Aluminium reacts with sulphur to form aluminium sulphide.

....

(v) On grinding iodine and mercury in a mortar, a yellowish green powder of mercurous iodide is formed.

....

7. **(a) What is chemical formula?**

....

....

....

....

(b) What does a chemical formula indicate?

....

....

....

....

(c) What is valency?

....

....

....

....

(d) Write down formulae of

(i) Hydrogen sulphide containing two atoms of hydrogen and one atom of sulphur per molecule.

....

(ii) Nitrous oxide containing two atoms of nitrogen and one atom of oxygen per molecule.

....

(iii) Sodium chloride containing one atom each of sodium and chlorine.

....

(iv) Sodium Nitrate containing one atom of sodium, one atom of nitrogen and three atoms of oxygen per molecule.

....

(v) Hydrochloric acid, containing one atom of hydrogen and one of chlorine.

....

(e) Find valencies from the following formulae:

(i) SO_3 S = ... O = ...
(ii) Al_2S_3 Al= .... S = ...
(iii) H_2O H= .... O = ...
(iv) $CaCl_2$ Ca = ... Cl = ...
(v) Fe_2O_3 Fe = ... O = ...
(vi) PCl_5 P = ... Cl = ...

8. (a) State the law of conservation of mass.

....

(b) What is the significance of this law?

....

....

(c) Four grams of mercury were obtained on heating 4.32 grams of mercuric oxide. What is the quantity of oxygen liberated

in the reaction?

....

....

9. Calculate the percentage of oxygen in

(a) Cupric oxide (CuO) = ...

(b) Ferric oxide (Fe_2O_3) = ...

(c) Mercuric oxide (HgO) = ...

10. (a) What does a chemical equation indicate?

....

....

....

....

(b) List out the rules to be observed to write a chemical equation.

....

....

....

....

(c) Balance the following equations:

(i) $Fe+O_2 \longrightarrow Fe_2O_3$

....

(ii) $H_2+Cl_2 \longrightarrow HCl$

....

(iii) $Mg+H_2O \longrightarrow Mg(OH)_2$

....

(iv) $Na+Cl_2 \longrightarrow NaCl$

....

(v) $Al + HCl \longrightarrow AlCl_3 + H_2$

....

(vi) $Hg + O_2 \longrightarrow HgO$

....

(vii) $Al + O_2 \longrightarrow Al_2O_3$

....

(viii) $Ag_2O \longrightarrow Ag + O_2$

....

(ix) $Fe + HCl \longrightarrow FeCl_3 + H_2$

....

(x) $Fe_2O_3 + H_2 \longrightarrow Fe + H_2O$

....

11. Write each of the following as a balanced chemical equation:

(a) Carbon + Oxygen → Carbon Dioxide
(b) Sodium + Chlorine → Sodium Chloride
(c) Magnesium + Oxygen → Magnesium Oxide
(d) Hydrogen + Chloride → Hydrogen Chloride

12. Put a √ mark against the right ones and × mark against the wrong ones:

(a) The formula of sodium chloride is $NaCl_2$.
(b) In a exothermic reaction heat is liberated.
(c) In a endothermic reaction heat is absorbed.
(d) Substances are made up of tiny particles called molecules.

☐ ☐

CHAPTER 3

ACIDS, BASES AND SALTS

Oxides are formed when metals and non-metals are burnt in oil. Some oxides are acidic and some oxides are basic. The oxides of non-metals (CO_2,SO_2) are acidic in nature. The oxides of metals (CaO, MgO) are basic in nature. With water acidic oxides give acids but basic oxides give alkalies.

Acidic and Basic oxides react with alkalies and acids respectively to give salt and water. The oxides which react both with acids as well as bases to form salt and water are called amphoteric oxides.

Acids are chemical compounds that have common characteristics :

(i) Sour in taste, (ii) Turn blue litmus red,
(iii) Corrode metals, (iv) Contain only non-metals,
(v) turn methyl orange red.

All acids contain hydrogen atoms in their molecules e.g., HCl, H_2SO_4, HNO_3 etc.

Bases are oxides and hydroxides of metal. Bases which dissolve in water form alkalies. They have common characteristics:

(i) Have a bitter taste, (ii) Found slippery when rubbed between the fingers, (iii) Dissolve fats and oils, (iv) Turn red litmus blue, (v) methyl orange yellow.

When alkalies react with acids, salt and water are formed. This reaction is known as *neutralization.*

A substance formed by the neutralization reaction of an acid with a base is called salt. Common salt is an essential constituent of our diet.

Soaps are prepared by the reaction of oils with NaOH. Glycerine is obtained as a by-product. Detergents are used for their better cleansing properties than soaps.

Water is of much use in our daily life. Some water is hard and some is soft. Hardness is due to the presence of $CaCl_2$, $MgCl_2$,$CaSO_4$, $MgSO_4$, $Ca(HCO_3)_3$, $Mg(HCO_3)_2$ etc. It can be removed by boiling water, by adding lime or by the permutit method. Hard water has got some advantages also. For bone and teeth formation, calcium is an essential item of diet.

Carbon dioxide is prepared by the reaction of calcium carbonate and conc. hydrochloric acid —

$$CaCO_3+2HCl \rightarrow CaCl_2 +H_2O +CO_2$$

It is a colourless, odourless gas. Soluble in water, changes blue litmus red and lime water milky. This is also used in fire extinguishers.

1. (a) What are acidic oxides? Give two examples.

....

....

....

(b) What are basic oxides? Give two examples.

....

....

....

(c) What are amphoteric oxides? Give two examples.

....

....

....

(d) Write the equations for the reactions by which the following oxides can be obtained:

(i) Sulphur dioxide..

(ii) Zinc oxide..

(iii) Magnesium oxide..

(iv) Carbon dioxide..

(v) Calcium oxide..

2. If you are given three test tubes containing an acid, a base, and water respectively, how will you determine the content of each one of them?

Acid : ....

Base : ....

Water : ....

3. **(a) What is neutralization reaction?**

....

....

....

(b) Write the chemical equation to represent neutralization between

(i) Sodium Hydroxide and Hydrochloric Acid.

....

....

(ii) Sulphuric Acid and Potassium Hydroxide.

....

....

4. **Explain with the help of chemical equation how the following acids are formed:**

(a) Sulphuric Acid : ....

....

(b) Nitric Acid : ....

....

(c) Hydrochloric Acid : ....

....

(d) Carbonic Acid : ....

....

5. **List the different characteristics of an acid:**

(i) ....

(ii) ....

(iii) ....

(iv) ....

(v) ....

6. Explain with the help of equations how the following bases are formed:

(a) Calcium Hydroxide : ....

....

(b) Potassium Hydroxide : ....

....

(c) Sodium Hydroxide : ....

....

(d) Aluminium Hydroxide : ....

....

7. What is an indicator?

....

....

8. What indicators do you use to test for the following?

(i) An acid .... (ii) A base ....

9. List the different characteristics of a base.

....

....

10. With the help of chemical equations show how the following salts can be formed:

(a) Calcium Carbonate : ....

....

(b) Calcium Sulphate : ....

....

(c) Copper Sulphate : ....

....

(d) Sodium Chloride : ....

....

(e) Ferrous Sulphate : ....

....

(f) Calcium Nitrate : ....

....

(g) Potassium Sulphate : ....

....

11. Write formulae of the following substances:

(i) Sodium Sulphate : ....

....

(ii) Magnesium Nitrate : ....

....

(iii) Zinc Sulphate : ....

....

(iv) Aluminium Nitrate : ....

....

(v) Calcium Chloride : ....

....

12. (a) Explain with the help of equations how soaps are formed?

....

(b) Define Salting Out.

....

(c) What is the most important difference between

(i) Soap and detergent : ....

....

(ii) Soft and hard water : ....

....

13. Name the salts responsible for causing hardness in water.

....

....

14. List the different ways by which hardness can be removed.

....

....

....

15. Why is distilled water used in research laboratories?

....

....

....

16. Explain with examples.

(a) Efflorescence..

....

(b) Deliquescence..

....

17. What change of colour would you observe when the following indicators are added to the substances listed below:

	Methyl Orange	*Litmus*	*Phenolphthalein*
(a) Dil. H_2SO_4	....	....	....
(b) NaOH solution	....	....	....
(c) NaCl solution	....	....	....
(d) Water	....	....	....

18. (a) Give the equation for the preparation of CO_2 gas.

....

....

(b) Write five properties of CO_2 gas.

....

....

....

....

☐ ☐

CHAPTER 4

HEAT AND ITS EFFECTS

Energy is the ability to do work. When an object has the ability to do work, we say that the object has energy. Heat has the ability to do work and hence it is a form of energy.

Heat can be converted to other forms of energy, e.g., in a steam engine, heat energy is converted into mechanical energy; a red hot ball emits light; Electric current is produced by heating one of the junctions of two dissimilar metals etc.

Other forms of energy can also be converted to heat energy. For example, in an electric bulb, electrical energy is converted into light and heat.

Most substances expand on heating and contract on cooling. Liquids expand more than solids and gases expand the most. Such expansion on heating is frequently used to make some tasks easier.

The degree of hotness of an object is called its temperature. We cannot rely on our sense of touch in order to measure the temperature of a body. We can use the fact that substances expand on heating in order to measure temperature accurately.

We can measure the *amount of heat* from the change in temperature that it produces. The unit for measuring the amount of heat is called the *calorie*. One calorie is that amount of heat which can raise the temperature of 1g of water by 1°C. Sometimes we also use the *kilocalorie* to measure the amount of heat. One kilocalorie can raise the temperature of 1 kg. of water by 1°C. The energy of food is measured in kilocalories.

The modern and internationally accepted unit of heat energy is **joule.** It is abbreviated as J.

1 calorie = 4.184 joules.

The *heat capacity of a substance* is the amount of heat needed to raise the temperature of a substance by 1°C. Its unit is *joules per °C*.

The *specific heat of a substance* is the amount of heat required to raise the temperature of 1 kilogram of a substance by 1°C. Its unit is *joule/kg°C*. Water has the highest specific heat.

Substances change their state from solid to liquid or from liquid to gas on heating. Changes of states take place at definite temperatures. The process by which a substance changes from the solid state to the liquid state is called *melting* and the temperature at which it takes place is called its *melting point*. The quantity of heat required to melt 1 kg of a substance at its melting point is called its *latent heat of fusion*. It is measured in *kilocalorie/kg*.

When a liquid changes to the gaseous state the process is known as *vaporization*. The temperature at which it takes place is called its *boiling point*.

Amount of heat gained or lost by a substance
= mass of the substance × its specific heat × rise or fall in temperature

1. (a) Distinguish between heat and temperature :

....

....

....

....

....

(b) Mention the modern and internationally accepted unit of heat energy.

....

(c) 1 calorie =..........................joules.

....

(d) Define specific heat of a substance and mention its unit.

Specific heat of a substance : ....

....

....

Unit : ....

....

(e) What is it and define :
(i) a Calorie :

....

....

(ii) a kilocalorie :

....

....

2. (a) **What is melting?**

....

....

....

(b) **Define melting point.**

....

....

....

3. (a) **What is vaporization?**

....

....

....

....

....

(b) **Define boiling point of a liquid.**

....

....

....

....

4. **What is Latent heat of a substance? Mention its unit.**
Lateat heat of a substance:

....

....

....

....

Unit : ....

....

....

5. **What are the factors on which the quantity of heat required to warm a substance depends?**

(i) ....

....

(ii) ....

....

(iii) ....

....

6. **(a) Give two examples of change of state from solid to liquid, stating the *fixed* temperature at which each takes place.**

(i) ....

....

(ii) ....

....

(b) Give two examples of change of state from liquid to gaseous, stating the *fixed* temperature at which each takes place.

(i) ....

....

(ii) ....

....

7. **Match the words given in Column A with those of Column B and write the complete sentences:**

Column A	*Column B*
(i) Water boils at	(i) 0°C or 32°F
(ii) Melting point of ice is	(ii) 540 kcal/kg
(iii) Latent heat of ice is	(iii) 80 kcal/kg
(iv) Latent heat of water is	(iv) 350°C
(v) Murcury boils at	(v) 100°C or 212°F
(vi) Alcohol boils at	(vi) 78°C

(i) ....

(ii) ....

(iii) ....

(iv) ....

(v) ....

(vi) ....

8. **Complete the following statements by filling the blanks with suitable words:**

(a) When we light a match stick, ...energy used in rubbing is converted into......................energy due to.........................

(b) Certain substances release...........................quicker than others.

(c) Heat always flows from a body at a.............................to a body at a ....

(d) A thermometer measures.................. It does not measure.................

(e) The temperature of boiling water is a ....temperature.

(f) 37°C is the temperature of a...

(g) 1 kilocalorie= ....calories.

(h) Whenever a substance undergoes a change of state it does so at a..................temperature.

(i) –10°C indicates a temperature..................below..................

(j) Mercury solidifies at............................whereas alcohol solidifies at
....

(k) Heat causes many..................................changes.

(l) Heat is capable of doing work as in..............................

(m) Heat energy is converted into..................as in electric bulbs.

(n) When we burn coal in a *sigree*, a major part of the............................
energy gets ....

(o) Temperatures corresponding to..................and..................marks are
called ....points.

(p) Changes of states take place at ....temperatures.

9. Why does a *poori* swell up on frying ?

....

....

....

10. When a worker breaks stones with his hammer, why does the temperature of the hammer increase?

....

....

....

11. Sometimes we have to warm the neck of a bottle whose lid is screwed tightly in order to unscrew the lid easily. Why?

....

....

....

....

12. When we pedal a cycle for some time, why do its tyres become warm?

....

....

....

13. Why is it unlikely that a *thin* glass tumbler will crack if hot water is poured into it, while a thick one is very likely to crack? Is there much risk of a thick copper vessel cracking in this way.

....

....

....

....

....

14. Why are iron tyres of tongas made smaller than the wooden wheels?

....

....

....

....

....

15. Why are small gaps kept between the rails on a railway track?

....

....

....

....

....

16. Two tumblers have stuck together into each other. How will you loosen them?

(i) by the use of hot water ?

(ii) by the use of cold water ?

(i) ....

....

....

(ii) ....

....

....

17. (a) What is wrong with this statement from a Newspaper: "The oven is fitted with a thermometer to measure the heat"? Write it correctly.

(b) Some thermometers are marked "Summer Heat", "Blood Heat". Is this correct?

(c) A celsius thermometer is placed first into a test tube of boiling water, and then into a large can of boiling water. What will it read in each case?

(d) Which has the higher temperature, the boiling water in a kettle placed on a fire or the spark that passes now and then up the chimney ? Which contains the greater amount of heat ?

(a) ....

(b) ....

(c) ....

....

(d) ....

....

....

18. What is the principle of a liquid thermometer? How do we fix up 0°C and 100°C in the scale of this thermometer? Draw neat diagrams wherever necessary.

....

....

....

....

....

....

....

....

....

....

19. Which do you think expands more on heating—mercury or water?

....

....

....

20. Define heat capacity of a substance and mention its unit.
Heat Capacity of a substance: ....

....

....

....

Unit : ....

....

21. If we supply the same amount of heat to 1 kg of copper and 1 kg of aluminium, which would have the higher temperature ? Sp. heat of copper is 0.3762 J/kg°C and sp. heat of aluminium is 0.8778 J/kg°C.

....

....

....

....

22. A glass of 150 ml of water is kept in sunlight for 20 minutes. Its temperature goes up by 4°C. How much heat from the sun reaches the glass in one minute? (Sp. heat of water = 4·18 joule/kg°C).

....

....

....

....

....

....

23. How many joules of heat are needed to increase the temperature of 1 kg of iron by 80 degrees? (Specific heat of iron is 0.5298 joule/kg°C).

....

....

....

....

....

....

24. **Fill in the blanks:**

(i) Energy supplied by the steam engines is obtained from ....

(ii) In a toaster, electrical energy is changes into .... energy.

(iii) ....is produced when a moving wheel of an engine is stopped by applying brakes.

(iv) A .... ball emits light.

(v) When you rub your hands vigorously against each other, you can feel the heat produced from .... energy.

(iii) Why is no gauze used?

....

....

....

(iv) Why does the heated water rise?

....

....

....

....

5. Why is the handle of a kettle for boiling water usually covered with thin cane strips whereas a china teapot need not be fitted with a special handle?

....

....

....

....

6. Why are mud-houses colder in summer and warmer in winter?

....

....

....

7. Why is ice packed in saw-dust or wrapped in gunny bags?

....

....

....

8. Why are woollen clothes warmer than cotton clothes?

....

....

....

9. In a thermos-bottle, why are hot things kept hot while cold things are kept cold?

Or

In a thermos-bottle (i) Why is glass chosen as the material for the bottle? (ii) Why is the surface silvered? (iii) Why is the space evacuated?

....

....

....

10. Why is a room heater always placed near the floor of a room and not near its ceiling?

....

....

....

11. Although water is a poor conductor of heat, a pan of water is quickly heated over a burner. Why?

....

....

....

12. Why does not a burning coal placed on the muslin cloth stretched over a copper pot burn it?

....

....

....

(vi) .... has the highest specific heat.

25. (a) If you have to choose a material to build a solar heater, which material would you choose?

....

....

(b) If you have to build a water cooler, which material would you choose?

....

....

26. 200 ml of cold water at a temperature of 10°C is added to 50 ml of hot water at a temperature of 60°C. What will be the final temperature? (Specific heat of water is 4.2 joule/kg°C).

....

....

....

....

....

☐ ☐

CHAPTER 5

TRANSFER OF HEAT

There are *three* distinct processes by which the transfer of heat may take place—*conduction, convection* and *radiation.*

Conduction is a process by which heat is transferred from one part of the body to the other part *without* actual movement of the particles of the body. The kinetic energy of the molecules is given directly by contact to other molecules with which they collide. Some solids are better conductors of heat than others. Davy's Safety Lamp is a very important application of good conductor.

Convection is a process by which heat is transferred from one place to another by the actual movement of the particles. The process of convection is used to cool the engines of motor cars; heating system in buildings; ventilation in houses; land and sea breeze; ocean currents, etc.

Radiation is a process by which heat is transferred from one place to another without heating the intervening medium. We receive heat from the sun by radiation.

The amount of heat absorbed by radiation by a body depends on (i) the *distance* between it and the source of the radiation and (ii) the colour of the body.

The darker bodies absorb radiation and also emit radiation better than bodies of lighter colours.

A thermos flask is an example of a useful device in which the normal conduction, convection and radiation of heat are greatly reduced.

1. Name the *three* different process by which heat is transferred from one place to another and then distinguish between them giving *one* example in each case.

....

(i) ....

....

(ii) ....

....

(iii) ....

Difference between the three Processes:

....

(i) **Example** : ....

....

....

(ii) **Example :** ....

....

....

(iii) **Example :** ....

....

....

2. **What are good conductors of heat and bad conductors of heat (or Insulators)? Give *four* examples in each case.**

Good Conductors:

....

....

....

Examples:

(i) .... (ii) ....

(iii) .... (iv) ....

Insulators:

....

....

....

Examples:

(i) .... (ii) ....

(iii) .... (iv) ....

3. **Pick out the good and bad conductors of heat from the following list: Brass; cardboard; ebonite; glass; iron; brick; straw; mercury; air; silver; copper; wood; leather; wool; feathers;**

paper; abestos; cork; bricks; grass; mud; fur of animals; wire gauze.

Good Conductors	*Bad Conductors*
....	....
....	....
....	....
....	....
....	....
....	....
....	....

4. (a) Describe an experiment to show the convection of heat in water. Draw a neat diagram with arrows showing the movement of warm and lighter water upwards.

....

....

....

....

(b) In the above experiment:

(i) What is the Potassium Permanganate for?

....

....

....

(i) Why should a small flame be used?

....

....

....

13. (a) If we hold a wire gauze over a gas burner, the gas burns below the gauze and not above it. Why?

....

....

....

(b) If we light the gas above the gauze, does the flame spread below it? Why?

....

....

....

14. Why are new quilts warmer than old ones?

....

....

....

15. In winter, why do birds sit with their wings spread out?

....

....

....

16. How does nature protect the animals living in the colder regions of the earth from cold?

....

....

....

17. Why are kettles blackened at the bottom and polished from outside?

....

....

....

18. Why do we wear white clothes in summer and dark clothes in winter?

....

....

....

19. Why are deserts hot during the day and cooler at night?

....

....

....

20. What mode or modes of transference of heat operate in the following cases?

(a) A hand held over a fire.

....

(b) A hand held in front of a fire.

....

(c) A room heated by hot water pipes running along the floor.

....

21. Fill in the blanks with suitable words:

(i) All metals readily............heat whereas gases and liquids are............... with the exception of ....which is a good conductor.

(ii) Air is a very ....

(iii) Coal gas will burn if it is heated, but it must be heated to a sufficiently high temperature. This temperature is called its ....

(iv) The fact that a flame will...........through wire gauze was made use of by Sir Humphry Davy in constructing a lamp which would..................fire to explosive gases in a coal mine.

(v) Liquids and gases are good ....

(vi) Large halls, cinemas etc. are frequently............by shatts in the roof through which the ....escapes,............being drawn in at ventilators set in the walls.

(vii) ....are used for making utensils, in machinery etc.

(viii) Mosquitoes respond to the............by human bodies.

(ix) If we............our distance from the fire, we will feel............warm.

(x) Heat can be transferred from...................temperature to.................... temperatures by means of.....................or..........................

(xi) Dark substances...................and.................., ...more heat than............. substances.

(xii) We get heat from the sun by means of ....

(xiii) In conduction, heat travels ....the movement of the particles.

(xiv) In convection, heat travels ....the movement of the particles.

(xv) In radiation, heat travels ....heating the medium.

(xvi) Air and water are heated by ....

(xvii) Conduction and convection are ....processes while radiation is a............process.

22. Rearrange the items of Column *B* so that each one is on the same line with that in Column *A* which is most closely related to it and rewrite the complete sentences below:

Column A	*Column B*
(*a*) Sun cooker	(*a*) keeps hot things hot and cold things cold.
(*b*) Black bodies	(*b*) are caused by convection.
(*c*) Trade winds	(*c*) receives heat by radiation.
(*d*) Thermos flask	(*d*) is based upon conduction of heat.
(*e*) Davy's safety lamp	(*e*) are good absorbers of heat.

(*a*) ....

(*b*) ....

(*c*) ....

(*d*) ....

(*e*) ....

23. Name the Physical Principles made use of in the case of the following:

(i) Ventilation.

....

(ii) Heating system in large buildings.

....

(iii) Working of chimneys of lamps and furnaces.

....

(iv) Greater warmth of woollen clothes than cotton ones.

....

(v) Wrapping of ice in gunny bags.

....

(vi) Davy's safety lamp.

....

(vii) Land and Sea breezes.

....

(viii) Ocean currents.

....

(ix) Storms.

....

(x) Double fly-tents.

....

(xi) Double walled houses of snow in Polar regions.

....

(xii) Metal spoon placed in a glass tumbler when boiling water is poured in it without breaking it.

....

....

24. What are the conditions needed for the conduction of heat?

....

....

....

....

25. Why is sunlight hot while moonlight is cool?

....

....

....

26. A cold spoon is dipped in a hot cup of tea. By which process does the spoon absorb heat from the tea?

....

....

....

27. A piece of wax floats on the water surface in a test tube. If we heat the water from the bottom of the test tube, would the wax melt soon? Why?

....

....

....

....

....

28. Fill in the blanks:

(i) Venus, Earth and Mars are .... than the outer planets Saturn, Uranus because of the .... between each planet and the sun.

(ii) Uranus has no atmosphere around it that would act as a heat ....

(iii) The amount of heat that a body can absorb by radiation depends on (a) .... and (b) ....

☐ ☐

CHAPTER 6

LIGHT AND SHADOWS

Light is that form of energy which enables people to "see" things.

An object that gives out light is called source of light. Our chief source of light is the sun. The sun is a *natural* source of light. Stars are other natural light sources. There are other sources of light that are not natural but *manmade* or *artificial*. Objects which give off their own light are called *luminous* objects. There are also *non-luminous* objects which do not produce any light. Substances through which light can pass are called *transparent* and substances which allow only part of light to pass through are called *translucent*. Substances which do not allow the light to pass through them are called *opaque*.

Some sources of light are brighter than others. The brightness or the *luminous intensity* of a light source is measured in units called *candle power*. The modern internationally accepted unit of brightness of a source is the *lumen*. One lumen is equal to 12.56 candle power. 700 lumens ≈ 1 watt. The brightness at a given surface is measured in units of *lumen per unit area* called *foot candles*. The modern unit is the *lux*. 1 foot candle = 10.76 lux.

The moon has various *phases*. This is because not only does the moon revolve round the earth, it also revolves round the sun, along with the earth.

Light has rectilinear propagation i.e. light travels in a straight line. Periscope is based on this principle.

Shadow is the dark region immediately behind an opaque object when it is placed in the path of rays of light. Thus shadows are produced when light is stopped by objects. An opaque object casts a dark shadow, a translucent object a weak one and a transparent object no shadow at all. The shadow of an object is formed in the direction opposite to the side of the light source. The length of the shadow formed by sunlight changes with time. By measuring the length of the shadow formed by a tree or a tall building in sunlight, we can calculate its height.

When moon comes in between the earth and the sun and its shadow falls on the earth, *solar eclipse* is caused. The *lunar eclipse* occurs when the sun, the earth and the moon are in a straight line with the earth between the sun and the moon. Thus eclipses are simply a play of shadows.

1. (a) **What is light ?**

Light: ....

....

(b) **Write down four natural sources of light.**

Natural sources of light :

(i) ....

(ii) ....

(iii) ....

(iv) ....

(c) **Name our main natural source of light.**

....

(d) **List five artificial sources of light.**

Artificial sources of light :

(i) ....

(ii) ....

(iii) ....

(iv) ....

(v) ....

2. (a) **What is meant by luminous intensity of a light source?**

....

....

....

(b) **What is a lumen?**

....

....

(c) **What is a lux?**

....

....

....

3. **Distinguish between luminous bodies and non-luminous bodies. Give three examples of each from your daily life.**

Luminous bodies : ....

....

....

Examples :

(i) ....

(ii) ....

(iii) ....

Non-luminous bodies : ....

....

....

Examples :

(i) ....

(ii) ....

(iii) ....

4. **Write the missing words in the following statements :**

(i) A region of full shadow is called a ....

(ii) The penumbra is a region of .... shadow.

(iii) A small source of light produces a .... shadow of a large opaque object in front.

(iv) Eclipses are produced on account of propagation of light in ....

(v) Eclipses of the sun are due to the shadow cast by the ....

Solar eclipse occurs only on .... moon days.

(vi) The shape of a shadow is similar to that of the .... but the ....of the shadow may not be equal to the ....of the object.

(vii) We must never watch the sun without ....our eyes.

(viii) Lunar eclipse occurs only on .... moon days.

(ix) ....can be used to measure heights of tall buildings or trees.

(x) The shadow of an object is formed in the direction....................to the side of the light source.

5. Name three sources of light that are not hot.

(i) ....

(ii) ....

(iii) ....

6. (a) Name four sources of light which give both heat and light.

(i) ....

(ii) ....

(iii) ....

(iv) ....

(b) Give two examples of incandescent bodies.

(i) ....

(ii) ....

(c) "The tube light is a cold source of light." Is this statement true? If so, why?

....

....

....

....

....

....

(d) Explain briefly the statement: "The sun is literally a burning globe."

....

....

....

....

....

....

7. Distinguish between

(a) Umbra and Penumbra. Give neat and labelled diagrams to illustrate your answer.

Umbra :..

....

Penumbra :..

....

(b) Define opaque, transparent and translucent bodies. Give *three* examples of each.

Opaque bodies : ....

Transparent	*Translucent*	*Opaque*

20. Which of these objects are luminous:
Camera; firefly; mirror; a car bumper; filament of a bulb; diamond ?

Luminous :

....

....

....

21. Give *three* interesting facts about shadows:

(i) ....

....

....

(ii) ....

....

....

(iii) ....

....

....

☐ ☐

CHAPTER 7

MIRRORS AND REFLECTION OF LIGHT

Whenever light rays strike a polished surface at a certain angle, they will bounce back into the air. This bouncing back of light rays from a polished surface is called *reflection of light*.

Mirror is a highly polished surface which reflects most of the light that falls on it. If the surface of a mirror is plane then it is called a *plane mirror* and if it is curved then it is called a *curved mirror*. If it is part of a sphere, then it is called a *spherical mirror*.

There are two laws of reflection :

(i) The angle of incidence is equal to the angle of reflection.

(ii) The incident ray, reflected ray and the normal at the point of incidence are all in the same plane.

The image formed by a plane mirror is virtual, erect and of the same size as the object but laterally inverted and is as far behind the mirror as the object is in front of it.

A concave mirror converges most rays while a convex mirror diverges most rays. Hence a concave mirror is sometimes called a converging mirror and a convex mirror is called a diverging mirror. The concave mirror converges parallel rays or rays from a distant object to a point known as the *focus* of the mirror and forms a real, inverted and diminished image of the object there. The convex mirror diverges rays from distant objects and forms a virtual, upright and diminished image behind the mirror at a point called its *focus*. The distance between a curved mirror and its focus is called the *focal length* of the mirror. When the object lies *within* the focus of a concave mirror, a virtual, erect and enlarged image is formed behind the mirror. Concave mirrors are used in torchlights, search lights and in special mirrors for shaving.

Convex mirrors are used in cars to enable the driver to see other cars approaching from behind.

1. **Define :**

(i) Reflection of light :..

....

14. Give one experiment to show that the brightness of the source of light *diminishes* with distance of a given surface from the source.

15. Draw a labelled diagram to show the various *phases* of the moon. When do we have *purnima* ?

....

....

....

....

....

16. What is a periscope? Draw its labelled diagram. How does it work? Mention its two uses.

Periscope:

....

....

....

....

Labelled diagram :

Uses:

(i) ....

(ii) ....

17. What is meant by *earthlight* ?

....

....

....

....

18. What should be the shape of an object so that it will cast no shadow (or very little) on the ground in sunlight?

....

....

....

....

19. Classify the following under transparent, translucent and opaque : Diamond; the moon; the stars; the planets; a sheet of paper dipped in oil; the sun; water; palm oil; glass; a brass tray; kerosene; candle light; nylon; stained glass; ground glass.

....

(ii) Transmission of Light : ....

....

....

(iii) Incident ray of Light : ....

....

....

(iv) Reflected ray of Light : ....

....

....

(v) Angle of Incidence : ....

....

....

(vi) Angle of Reflection : ....

....

....

2. **(a) State Laws of Reflection of Light :** ....

(i) ....

....

(ii) ....

....

(b) What is a mirror ? Is the moon a mirror?

....

....

....

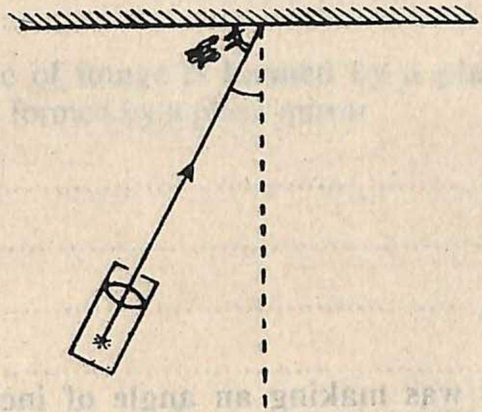
(c) **What is a plane mirror?**

....

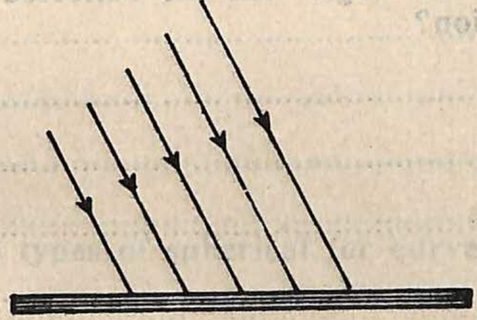
....

(d) **Complete and label the following diagrams showing the reflection of light:**

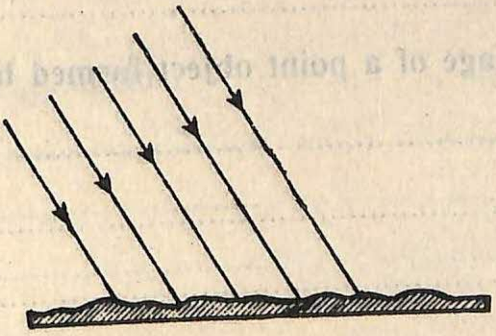
(i)



(ii)



(iii)



3. (i) An incident ray of light forms an angle of 30° from the surface of a plane mirror. What will be the angle between the incident ray and the reflected ray? Draw a labelled diagram.

(ii) A ray of light was making an angle of incidence of 25° on a plane mirror. If the angle of incidence is now increased to 35° through what angle will the reflected ray shift from its original position?

....

....

....

....

(iii) An what angle should a ray of light form the incident and the reflected rays to be mutually perpendicular?

....

4. (a) Define an image of a point object formed by a plane mirror.

....

....

....

....

(b) **Distinguish between *Real* image and *Virtual* image of an object. Which one can be obtained on a screen and why?**

....

....

....

....

(c) **What type of image is formed by a plane mirror?**
The image formed by a plane mirror

(i) is ....

(ii) lies ....

(iii) is ....

(iv) is of the ....

5. (a) **What is a spherical or curved mirror? How does it differ from a plane mirror?**

....

....

....

....

(b) **Name two types of spherical (or curved) mirrors.**

(i) ....

(ii) ....

(c) **How do the two types of curved mirrors differ from each other?**

....................mirror	....................mirror
....	....
....	....
....	....
....	....

6. **Define :**

(i) Radius of curvature of a spherical mirror : ....

....

....

(ii) Centre of curvature of a spherical mirror : ....

....

....

(iii) Vertex of a spherical mirror : ....

....

....

(iv) Principal axis of a spherical mirror : ....

....

....

(v) Principal focus of a spherical mirror (draw a labelled diagram) :

....

....

....

....

....

....

....

....

(vi) Focal length of a spherical mirror : ....

....

....

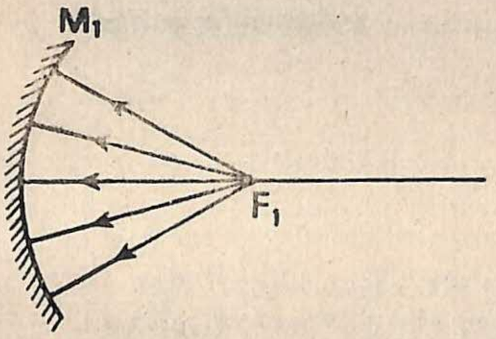
7. (a) What is the relationship between the focal length (f) and the radius of curvature (r) of a spherical mirror?

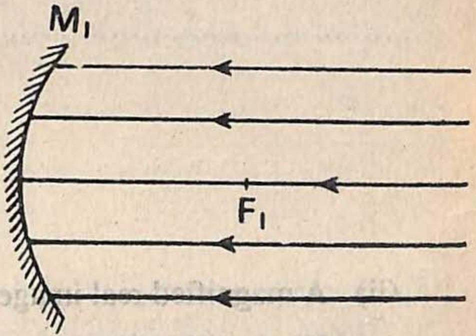
....

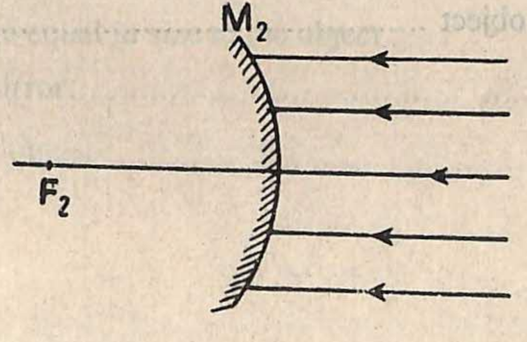
....

....

(b) Complete the following diagrams to show the paths of the rays after reflection from the curved mirrors M_1 and M_2 which have foci F_1 and F_2 respectively.







(c) An object is placed at the centre of curvature of a concave mirror which is 50 cm from its vertex on the principal axis. What is the focal length of the concave mirror?

....

....

8. Name the kind of mirror and the position of the object and draw a labelled ray diagram in order to get:

(i) A diminished real image :

Kind of the mirror ....

Position of the object ....

(ii) A magnified real image :

Kind of the mirror ....

Position of the object ....

(iii) A diminished virtual image :

Kind of the mirror ....

Position of the object ....

(iv) A real image equal in size to the object :

Kind of the mirror ....

Position of the object ....

(v) A virtual image equal in size to the object :

Kind of the mirror..

Position of the object ....

(vi) A magnified virtual image :

Kind of the mirror ....

Position of the object ....

9. Mention the various uses of spherical (concave and convex) mirrors in everyday life.

Uses of concave mirrors :

(i) ....

(ii) ....

(iii) ....

(iv) ....

Uses of convex mirrors :

(i) ....

(ii) ....

(iii) ....

(iv) ....

10. A lady wishing to pin a flower on the right side of her head, pins it on the left side while looking into the mirror. Explain why?

....

....

....

....

....

11. What is the difference between a mirror and a glass sheet?

....

....

....

....

....

12. You can see your face in the polished top of a table, but you cannot see it when it is not polished. Explain.

....

....

....

....

....

....

13. (a) State the *three* things that may happen to a beam of light striking a body.

(i) ....

(ii) ....

(iii) ....

(b) Which of the *three* is most likely to occur when a beam of light strikes the following (Write your answer against each within brackets) :

1. a plane mirror (..)
2. a plane glass (..)
3. a polished table (..)
4. coal tar (..)
5. a perfectly transparent body (..)
6. a piece of diamond (..)
7. a black cloth (..)
8. water (..)
9. stained glass (..)

14. Complete the following sentences:

(i) When a ray of light strikes a smooth surface and is sent back, it is said to be ....

(ii) .... surfaces act like mirrors.

(iii) If we throw a ball towards the plane mirror, the image of the ball appears to be moving ....the surface of the mirror.

(iv) The image formed by a convex mirror is .... and ....than the size of the object.

(v) If the angle of incidence of a ray of light is 90 degrees, its angle of reflection will be .... degrees.

(vi) The .... of a concave mirror is half its radius.

(vii) Spherical mirrors have a .... point.

(viii) Whenever a ray of light falls normally (i.e. angle of incidence is 0 degree) on a mirror, it gets reflected along the ....path.

15. A concave mirror may be used for all but *one* of the following. This is

(A) a magnifying mirror

(B) a torch reflector

(C) a reflecting telescope

(D) a dentist's mirror

(E) a car wing mirror.

....

16. A object is placed 20 cm in front of a plane mirror. The mirror is moved 2 cm towards the object. The distance between the positions of the original and final images seen in the mirror is

(A) 2 cm (B) 4 cm (C) 10 cm (D) 18 cm

....

17. When parallel rays are reflected from a smooth, plane surface, the reflected will be

(a) parallel to the incident rays

(b) parallel to each other

(c) non-parallel

(d) part of a spherical surface

....

18. In the case of a concave mirror, match the items in Column *B* against the items in Column *A* :

Column A (Position of object)	***Column B*** (Position of image)
(a) very far away	(i) very far away
(b) At C	(ii) Between F and the vertex
(c) Between F and the vertex	(iii) At C
(d) Beyond F and C	(iv) Between F and C
(e) At F	(v) At F
(f) Beyond C	(vi) Beyond C on the same side as the object
	(vii) On the other side of the mirror i.e. behind it.

(a) ....

(b) ....

(c) ....

(d) ....

(e) ....

(f) ....

19. How many reflected rays can there be for a given *single* incident ray falling on a plane mirror?

....

20. Barber shops have two mirrors hanging on opposite walls facing each other. How many images of a person can one see if he stands before them. Why?

....

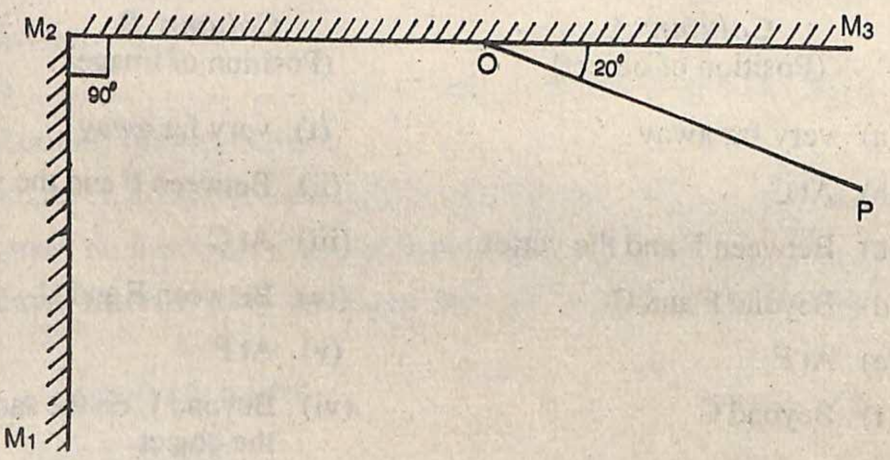
....

....

....

....

21.



Two plane mirrors are kept at 90° to each other as shown in the figure above. The incident ray of light PO is shown as falling on the plane mirror M_3M_2 at an angle of 20°.

(a) Draw the path of the ray and show the path of the reflected ray.

(b) What will be the angle of reflection of the *finally* reflected ray ?

....

....

☐ ☐

CHAPTER 8

SOUND

A body produces sound only when it is in a state of vibration. *Vibration* is a repeated to and fro motion. This motion is also called an *oscillation. Amplitude* is the maximum displacement of a vibrating body on either side of its mean position.

The time taken to complete one oscillation is called the *time-period.* The number of vibrations or oscillations made in one second is called the *frequency* of a sounding body. It is measured in *hertz* (Hz).

Sound requires a material medium for its propagation. Sound travels in air at a speed of about 330 metres/second at 0°C. Solids and liquids can transmit sound faster than air because of their large elasticity.

The sound produced by various vibrating bodies are distinguished from each other by their characteristics such as *loudness* and *pitch.* The loudness of sound depends on the amplitude of vibration. The frequency of vibration gives the sound its *shrillness* or *pitch.*

Music is the arrangement of sounds of different frequencies called *notes* or *swara* in a way that is pleasant to hear.

On striking some surfaces, sound waves get reflected. Some of the substances absorb sound when it strikes them. Sometimes, we hear a sound directly separate from its reflected sound. This causes *echo* of the original sound. An echo is thus simply a reflected sound.

The human ears do not respond if the frequency of oscillation is less than 20 hertz. Nor can human ears hear sound if its frequency is greater than 20,000 hertz. Sound of frequency greater than 20,000 hertz is called *ultrasonic*. Some animals can hear ultrasonic sound and some animals can produce ultrasonic sounds.

The human ears are the delicate and sensory organs that aid us in hearing. They need special care inspite of the protection provided by nature. Damage to the ear drum can make one deaf.

1. **Complete the following statements :**
   (i) If a string held tightly between two points is suddenly plucked, it produces.............which is due to the fact that the string is..............
   (ii) Very slow vibrating bodies and very fast vibrating bodies do not produce .... sounds.

(ii) ....

(iii) ....

13. Give one experiment to show that a material medium is necessary for the propagation of sound. Draw a labelled diagram to illustrate the experiment.

Diagram :

Experiment : ....

....

....

....

....

....

....

....

....

....

14. (a) How can two whales hundred of kilometres from each other can talk to each other under water?

....

....

....

....

(b) One whale says something to its friend 75 km away in deep water. How long will it be before the friend can hear this ? Speed of sound in water is 1500 m/s.

....

....

....

....

15. (a) The speed of sound in water is 1500 ms^{-1}. How far away from an under sea rock, should a deep sea diver be, so that he can hear his own echo?

....

....

....

....

(b) Where would sound travel faster: In iron or in water?

....

....

....

....

16. Which of the following materials will give a good echo and which would stifle or muffle sound falling on them?
Wood; steel; asbestos; paper; thermocole

....

....

(iii) The disturbance due to....................and..............of air layers around a vibrating body forms.................................

(iv) The speed of sound is.....................*m* per second and sound travels not only through gases but also through....................and.........................

(v) Our ears hear a..............of sound which create different..............on the ear.

(vi) The sound produced by the humming of a bee is..............than the roaring of a lion, though the latter is much ....

(vii) All the parts of the human ear carry the vibrations created by the sound in the................to the.............nerve which in turn takes the message to the..........................

(viii) Musical instruments produce..........................vibrations.

(ix) On striking some surfaces, sound waves get.............and some of the substances......................sound when it strikes them.

2. (a) **When does a body produce sound?**

....

....

(b) **Give *three* examples of bodies producing sound.**

(i) ....

....

(ii) ....

....

(iii) ....

....

3. **Which object is vibrating when the following sounds are produced:**

(i) The sound of the tabla.

(ii) The sound of a school bell.
(iii) The buzzing of a mosquito.
(iv) The sound of a sitar.
(v) The transistor.
(vi) The sound of a bursting cracker.

(i) ....

(ii) ....

(iii) ....

(iv) ....

(v) ....

(vi) ....

4. (a) **Define the following terms :**
Vibration or Oscillation; amplitude; frequency; time period.

Vibration (Or Oscillation) : ....

....

....

....

Amplitude : ....

....

....

Frequency : ....

....

....

Time Period : ....

....

....

(b) What is the unit of frequency?

....

(c) How is frequency related to time period of a vibrating body?

....

(d) What is the time period of a simple pendulum which is vibrating at 50 hertz?

....

....

....

5. Answer the following :

(a) During a thunderstorm, the thunder and the lightning occur simultaneously but we hear the thunder a few seconds after seeing the lightning. Why ?

....

....

....

(b) How is it possible for a deaf person to hear the sound of a watch held by his teeth ?

....

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....

(c) Why are the walls of some buildings made hollow and why is the air removed from inside ?

....

....

....

(d) Why is a speaker heard better in a room than outside in the open ground?

....

....

....

(e) Why are auditoriums, gymnasiums, radio and television sets provided with materials as curtains, draperies, rugs etc.

....

....

....

6. (a) How does a sound like that of thundering cloud differ from the sound of a musical instruments e.g., sitar?

....

....

....

(b) Does a change in the number of vibrations of a sounding body make any difference in the sound produced by it ?

....

....

....

7. (a) What is reflection of sound?

....

....

....

(b) What is an echo?

....

....

....

(c) What is the minimum distance required between the listner and the obstacle for the echo to be heard distinctly?

....

(d) How do we use the phenomenon of reflection of sound for measuring ocean depths?

....

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....

8. (a) A vibrating branch of a tree makes 15 oscillations in 5 seconds. What is its frequency in hertz?

....

....

....

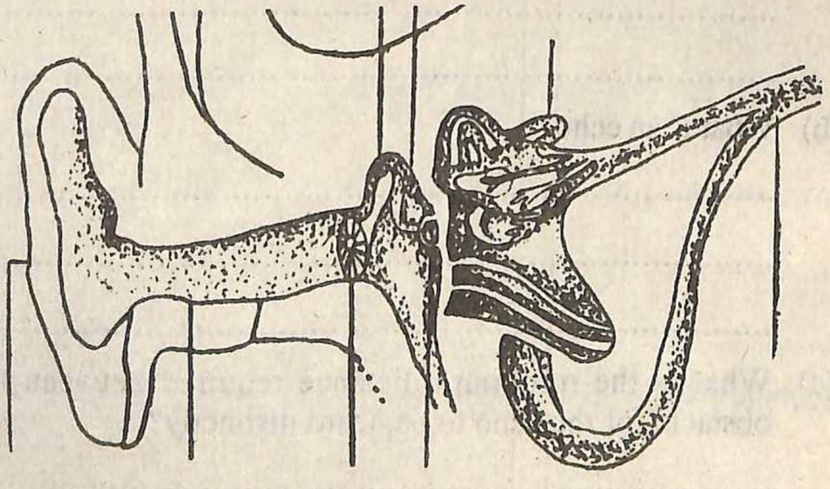
(b) Why do we not hear the screams of a bat ?

....

....

....

9. (a) Label the various parts of the human ear.



(b) Draw a schematic diagram showing the action of sound on the human ear and label its various parts.

(c) What is the function of :

(i) Outer Ear : ....

....

(ii) Ear Drum : ....

....

(iii) Middle Ear : ....

....

(iv) Auditory Nerves : ....

....

(d) How should we take care of our ears ?

(i) ....

....

(ii) ....

....

10. Match the words given in Column *A* with those of Column *B* by drawing lines :

Column A	*Column B*
(a) The speed of light is	(a) 20 and 20,000 vibrations per second
(b) Sound of higher frequency is said to have	(b) ultrasonics
(c) Human ear responds to	(c) 60 and 13,000 vibrations per second
(d) Human voice is in the range	(d) good reflectors of sound
(e) Sound vibrations above 20,000 vibrations per second are	(e) bad reflectors of sound
(f) Plywood and metallic sheets are	(f) higher pitch
(g) Cork and thermocole are	(g) $300,000 \text{ km s}^{-1}$

11. (a) Can sound be heard on the moon?

....

....

....

(b) If an observer places his ear at the end of a long steel pipe, he can hear two distinct sounds when a workman hammers on the other end of the pipe. Why ?

....

....

....

....

(c) Sometimes a loud sound such as a thunderclap rattles the windows of a house. Why ?

....

....

....

....

12. (a) Define loudness of a sound. Mention the factor upon which it depends.

Loudness of a sound :

....

....

....

....

Factor :

....

....

....

....

(b) What is meant by *shrillness* or *pitch* of a sound ? Upon what factor does it depend ?

Pitch or shrillness of sound : ....

....

....

....

....

Factor: ....

....

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....

....

....

(c) Arrange the following sounds in increasing frequency :

(i) Baby's voice (ii) Man's voice (iii) Woman's voice

(i) ....

....

....

....

....

....

17. Fill up the blanks :

(i) A tight membrane of a tabla vibrates at a much .... frequency than a loose one so that the sound produced has a higher ....

(ii) In a flute musical sound is produced by.......................a column of air.

(iii) Metallic sheets and plywood are..........................of sound whereas clothing and porous materials like cork or thermocole are ....of sound.

(iv) Some animals like......................, ..., ... and ....can hear ultrasonic sound while .... can produce ultrasonic sound.

(v) Bats use the sound...........................from obstacles to avoid them.

(vi) Regular vibrations produce...........................sounds while irregular vibrations produce.......................................

□ □

CHAPTER 9

ELECTRIC CHARGES AT REST

All bodies when rubbed together are said to be *charged* or *electrified.* There are two, and only two different kinds of charge–positive and negative. Like charges repel and unlike charges attract. A body need not necessarily be rubbed with another body to be charged. It is quite sufficient to touch it with some other charged body.

Electroscope is a device by means of which we are able to detect and identify charges.

Lightning takes place between two clouds or the cloud and the earth. Lightning conductor protects high buildings and installations from the hazards of lightning.

1. (a) What are electrically charged bodies ?

....

....

....

....

(b) Copper rod, Plastic rod and Glass rod are rubbed with a silk cloth. Which rod or rods will be left with an electric charge and why ?

....

....

....

....

2. (a) How could you demonstrate that there are two distinct kinds of electric charges ?

....

....

....

....

(b) Name the two kinds of electric charges

(i) .... (ii) ....

(c) An ebonite rod is rubbed with catskin and a glass rod is rubbed with silk. What kind of charge is developed on

(i) Ebonite rod .... (ii) Catskin ....

(iii) Glass rod........................ (iv) Silk ....

(d) How will you conclude from the experiment given in (a) above that "Like charges repel each other and unlike charges attract each other"

....

....

....

....

3. (a) Is rubbing the only way to charge a body?

....

(b) A charged ebonite rod is brought near a hollow paper cylinder suspended by a silk thread. The paper cylinder first gets attracted by the rod and then it is repelled. Explain why?

....

....

....

(c) How will you test whether the hollow paper cylinder is charged or not?

....

....

....

4. (a) What is an electroscope?

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....

(b) Explain the principle of action of an electroscope. Illustrate your answer by a neat diagram.

....

....

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....

....

(c) How can an electroscope be charged positvely by conduction?

....

....

....

(d) Given a charged body, how will you determine the nature of the charge on it by using an electroscope?

....

....

....

(e) What will happen to a charged electroscope when you touch its disc?

....

....

....

5. (a) Is human body a conductor?

....

(b) How will you distinguish between a conductor and an insulator by using an electroscope or electroscopes?

....

....

....

(c) How can we make electric charges flow ?

....

....

....

6. (a) How does lightning take place between the two clouds or the cloud and the earth?

....

....

....

(b) What is a lightning conductor?

....

....

....

....

(c) Explain the action of a lightning conductor. How does it protect high buildings and installations from the hazards of lightning ?

....

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....

7. **Fill in the blanks with suitable words:**

(i) When we rub a fountain pen on our sleeve, it will then....................bits of paper.

(ii) A body need not necessarily be....................with another body to be charged. It is quite sufficient, for instance, to....................it with some other.........................body.

(iii) The divergence of the leaves of an electroscope indicates the .... of an ....

(iv) Telegraph and telephone wires are made of copper as they are good .... These wires are placed on inverted cups of porcelain which are..........................

(v) If a discharge actually takes place, the..........................provides an easy passage to the charge from the cloud to the earth.

(vi) If we rub two rubber balloons on our clothing and hang them together by two threads, we will find that they .... and prove that ....

8. **Answer the following questions:**

(a) Why does a peacock feather, after being rubbed, spread out into a fan like shape ?

....

....

....

....

(b) Why are we advised not to be under a tree if we are in the open during a thunderstorm ?

....

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....

....

9. (a) Why does a rubber balloon, after being rubbed, stick on to a wall ?

....

....

....

....

(b) Do all bodies get charged after being rubbed ?

....

....

....

....

10. (a) Distinguish between conductors and insulators.

Conductors : ....

....

....

Insulators : ....

....

....

(b) Sort out Conductors and Insulators from the following list of materials :

Copper; silver; salt water; oil; aluminium; tungsten; glass; iron; rubber; paper; cotton thread; human body; graphite; silk; paraffin wax; dry air; mica; bakelite; plastics.

Conductors	**Insulators**
....	....
....	....
....	....

....

....

....

....

....

....

....

(c) Name the best conductor of electricity.

....

....

☐ ☐

CHAPTER 10

ENERGY

Work is done on an object only if a force acts on the object and the point of application of force moves due to the application of the force. *The ability to do work is known as* **energy.** The unit of energy *is newton-metre* (Nm) or *joule* (J).

A moving object has energy. The energy possessed by an object by virtue of its motion is called *kinetic energy* (K.E.).

The ability of an object to do work due to its position or shape is called *potential energy* (P.E.). Fuels have potential energy stored in them.

Kinetic energy and potential energy are examples of two types of energy together known as *mechanical energy.*

Energy can be converted from one form to another. Such conversion is known as *transformation of energy.*

According to law of conservation of energy,*"Energy can neither be created nor destroyed but can be transformed from one form to another."* Total energy of the system remains conserved in all natural processes.

Wood, water, wind, animal wastes and the sunlight are examples of *renewal sources of energy.* Coal and petroleum are examples of *non-renewable sources of energy.*

We must reduce our dependence on non-renewable resources. We must look for and use alternative fuels and sources. We must make greater and cleverer use of the sun.

Solar cells are devices which convert light from the sun into electricity.

1. Define : Energy; Kinetic Energy; Potential Energy; Mechanical Energy.

Energy : ....

....

....

Kinetic Energy: ....

....

....

Potential Energy : ....

....

....

Mechanical Energy : ....

....

....

2. (a) Give internationally accepted unit of energy.

....

....

....

(b) Give three examples each of (i) Kinetic energy and (ii) Potential energy.

Examples of kinetic energy :

(i) ....

(ii) ....

(iii) ....

Examples of potential energy :

(i) ....

(ii) ....

(iii) ....

3. (a) What is chemical energy? Give *four* examples of chemical energy.

Chemical Energy: ....

....

....

....

Examples:

(i) ....

(ii) ....

(iii) ....

(iv) ....

(b) Give an example where the mechanical energy is the same as potential energy.

....

....

....

4. Describe the mechanical energy of a body as it goes down a slide.

....

....

....

5. (a) What is transformation of energy?

....

....

....

(b) Give *two* examples of transformation of energy.
Examples :

(i) ....

(ii) ....

6. State the principle of conservation of energy. Give an example of this principle.
Principle of Conservation of Energy : ....

....

....

....

Example : ....

....

....

....

....

....

....

7. What are renewable sources of energy? Give *three* examples.

Renewable sources of energy : ....

....

....

....

Examples :

(i) ....

(ii) ....

(iii) ....

8. What are non-renewable sources of energy? Give *three* examples.

Non-renewable sources of energy : ....

....

....

....

Examples :

(i) ....

(ii) ....

(iii) ....

9. Why should we increase the use of renewable source of energy ?

....

....

....

....

....

....

....

10. (a) Name some devices that utilise solar energy.

....

(b) Why should we need to use our energy sources wisely and economically?

....

....

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....

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(c) How can we do this?

....

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11. Fill in the blanks:

(i) The water in an overhead tank possesses ....energy. When it flows through a pipe it possesses................................energy

(ii) The flowing water can run a dynamo and produces................................ energy.

(iii) ....energy of the muscles of the rider on a bicycle is changed into................................energy of the pedals.

(iv) An aeroplane flying in the sky possesses................................energy and ....energy.

(v) We do work whenever we................................an object.

(vi) Same type of work can be done by using................................sources of energy.

(vii) Animal waste is a................................source of energy.

(viii) When Miss P.T. Usha runs,................................energy is changed into ....energy.

(ix) A biogas plant uses................................as the source and gives ....and........................for use.

(x) A raised hammer possesses................................energy.

12. A rubber ball is dropped from a height of 4 metres. Describe the mechanical energy of the ball.

....

....

....

....

....

13. Give *one* example in each case, for the following transformation of energies:

(i) Chemical energy to electrical energy.
(ii) Electrical energy to mechanical energy.
(iii) Kinetic energy to potential energy.
(iv) Electrical energy to light energy.
(v) Light energy to electrical energy.
(vi) Electrical energy to sound energy.
(vii) Mechanical energy to heat energy.

(i) ....

(ii) ....

(iii) ....

(iv) ....

(v) ....

(vi) ....

(vii) ....

14. Following are some examples of different forms of energy. Mention the *form* of energy in each case :

(i) A boulder on top of a cliff.
(ii) A bullet travelling through the air.
(iii) A stretched spring.
(iv) The fast moving molecules of a hot gas.
(v) Cold hydrochloric acid and sodium hydroxide solutions reacting to give a *warm* salt solution.
(vi) Electricity through a lamp providing heat and light.
(vii) Steam condensing to scald your hand.
(viii) Light coming from the sun.
(ix) Energy stored in the nucleus of an atom.

15. A pendulum is set up so that the thread will swing against a pin (Fig. 10.1). If the pendulum bob is released from position A, what will be the energy changes as the bob moves to a new point of rest?

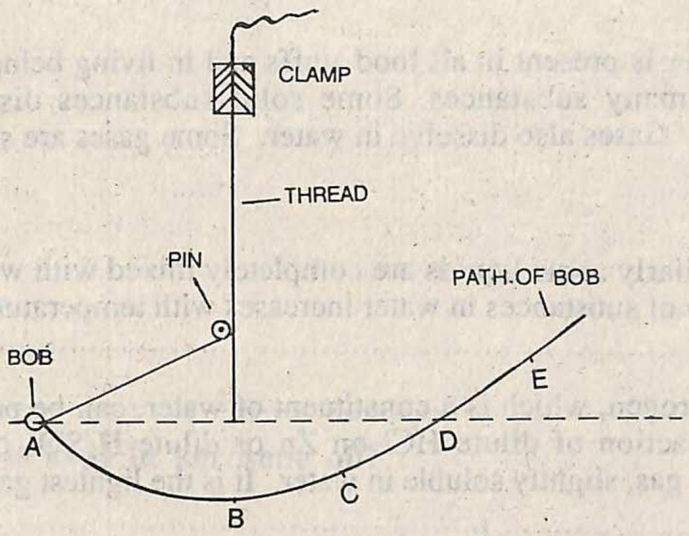

Fig. 10.1

....

....

....

....

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☐ ☐

CHAPTER 11

WATER

Water is present in all food stuffs and in living beings. It has great ability to dissolve many substances. Some solid substances dissolve in water to form solutions. Gases also dissolve in water. Some gases are soluble in water; some are not.

Similarly some liquids are completely mixed with water, while some are not. Solubility of substances in water increases with temperature.

Hydrogen, which is a constituent of water, can be prepared in the laboratory by the reaction of dilute HCl on Zn or dilute H_2SO_4 on Zn. It is colourless, odourless gas, slightly soluble in water. It is the lightest gas.

Oxidation is a process in which oxygen is added to an element or hydrogen is removed from any of its compounds.

Reduction is a process in which hydrogen is added to an element or oxygen is removed from any of its compounds.

Hydrogen is used for the preparation of vanaspati ghee, margarine ammonia gas, fertilizers, etc. It is used in oxy-hydrogen torch, which is used for welding and cutting metals. It is also used for filling balloons used by children and also for weather observations.

1. (a) List out the different physical properties of water.

....

....

(b) Enumerate the chemical properties of water.

....

....

....

(c) Draw a neat, labelled diagram of the apparatus used to demonstrate electrolysis.

....

....

(d) Why sodium is kept in kerosene oil?

....

....

(e) Why rain water is as good as distilled water?

....

....

....

(f) Write a few sentences about the distribution of water in nature.

....

....

....

2. Fill in the blanks:

(a) The mixture with suspended particles of fine solid particles or minute droplets is called.................... (b) Water solutions are called ....

(c) Water is a ....(d) Solid particles in a solutions are called .... (e) A solution in which a given .... stops .... further at a fixed temperature is called............................

3. Why is it necessary to pump air through water in the aquaria?

....

....

....

4. List out the different factors on which the solubility of gases in water depends.

....

....

....

5. In what different types liquids are divided into?

(a) ....

(b) ....

(c) ....

6. Fill in the blanks:

(a) Chemical symbol of Hydrogen is..........................(b) Molecular formula of Hydrogen is .... (c) Molecular weight of Hydrogen is .... (d) Atomic weight of Hydrogen is........................ (e) The addition of oxygen to hydrogen is called............................ (f) The removal of oxygen from water is called............................

7. Complete the following equations :

(a) $Zn + HCl \longrightarrow$

(b) $PbO + H_2 \longrightarrow$

(c) $CuO + H_2 \longrightarrow$

(d) $Fe + H_2O \longrightarrow$

(e) $Al + MnO_2 \longrightarrow$

8. List the various physical properties of Hydrogen.

....

....

....

....

9. List the important uses of Hydrogen.

....

....

10. Why do we feel uncomfortable on a hot humid day?

....

....

11. Define the following term and give one example in each case.

(a) Solution : ....

(b) Solute : ....

(c) Solvent : ....

(d) Saturated solution : ....

(e) Oxidation : ....

(f) Reduction : ....

(g) Oxidizing agent : ....

(h) Reducing agent : ....

12. How do fish and water plants survive in water?

....

....

13. What *three* minerals element cause hard water?

....

....

CHAPTER 12

AIR

Air is present everywhere around us. It is colourless, odourless and tasteless and is a mixture of different gases. Air is denser near the sea-level and becomes lighter as the height from sea-level increases.

Oxygen is the most important constituent of air. In nature it is produced by green plants. It can be prepared in the laboratory by heating potassium chlorate ($KClO_3$), potassium permanganate ($KMNO_4$) and potassium nitrate (KNO_3). It is also colourless, odourless, tasteless and slightly soluble in water. It is a supporter of combustion.

Carbon, magnesium, sodium, sulphur etc., burn in oxygen and their oxides are formed. The oxides of carbon and sulphur are acidic in nature. The oxides of sodium and magnesium are basic in nature. The oxygen present in air, in presence of little moisture, reacts with iron to produce rust (iron oxide) and rusting is prevented by coating the surface of iron with suitable paints.

Fish and other aquatic animals and plants breathe oxygen which is in dissolved state in water. It is also used in industry and hospitals. It is essential for burning. Oxy-acetylene flame is used for welding and cutting metallic plates.

1. **Draw a neat, labelled diagram of the apparatus used to show how the oxygen gas can be prepared in the laboratory. Give the equation for the preparation also.**

2. **List the constant and variable constituents of air?**

....

....

....

....

3. **List the local impurities present in air.**

....

....

....

....

4. **What are the following famous for:**

   (a) **Lemonosor** : ....

   ....

   (b) **Lavoisier** : ....

   ....

5. **If one cubic metre of oxygen weighs 1.43 kilograms, calculate the weight of oxygen present in the air in your class room.**

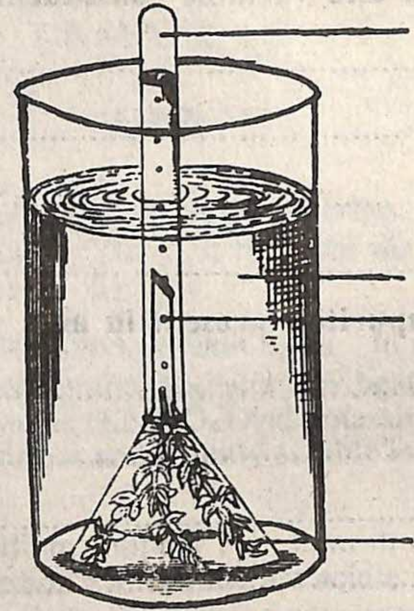
....

....

6. **Fill in the blanks:**

(a) Atomic weight of oxygen is............................ (b) Molecular weight of oxygen is .... (c) Chemical symbol of oxygen is .... (d) Molecular formula of oxygen is.............................. (e) The ....chemist .... first prepared oxygen in 1771. (f)............................studied the properties of oxygen. (g) Exhaled air contains more........................than inhaled air.

7. Label the indicators in the apparatus set up below:



8. (a) State the conditions under which the decomposition of potassium chlorate takes place. Write the equation to represent the reaction.

....

....

....

(b) What is the role of manganese dioxide in the reaction?

....

....

....

(c) Which property of oxygen is used for its collection in jars and gas cylinders?

....

....

....

9. Complete the following reactions by wording equations:

(i) Burning of sulphur in oxygen ....

....

(ii) Burning of magnesium in oxygen ....

....

(iii) Burning of sodium in oxygen ....

....

10. (i) Define the following:

(a) **Oxides** ....

....

(b) **Acidic oxides** ....

....

(ii) Given below is a list of oxides. Write (√) in front of acid oxides.

(a) Fe_2O_3 (b) PbO

(c) SO_2 (d) P_2O_5

(e) Na_2O (f) CO_2

11. Why is air necessary for burning wood, coal etc?

....

....

....

12. Why do we need extra oxygen supply at high altitude?

....

....

....

13. What is a catalyst?

....

....

....

....

14. **Explain the use of oxygen in (a) hospitals, (b) mountaineering.**

....

....

....

....

15. **Give *five* properties of O_2 gas.**

....

....

....

....

....

16. **What is air pollution?**

....

....

17. **Write the equation for the preparation of oxygen from Potassium chlorate.**

....

....

18. **Fill in the blanks :**

(a) $C + O_2 \rightarrow$ ......

(b) $Mg +$ .... $\rightarrow MgO$

(c) .... $+ O_2 \rightarrow CaO$

(d) $S + O_2 \rightarrow$ ......

CHAPTER 13

ORGANIZATION OF THE LIVING BODY

1. Discovery of cell is as old as the invention of microscope.
2. Under electron microscope cell can be studied in detail.
3. The centre for all life activities is in the cell.
4. The cell is a unit of form and function.
5. The cell of most plants and animals have nucleus, cytoplasm and cell membrane. In plant cells cell membrane is always protected by a cell wall.

Summary

1. The centre for all life activities is in the cell.
2. Discovery of cell is as old as the invention of microscope.
3. All living organisms are made up of cells, Organisms may be unicellular or multicellular.
4. The cells of most plants and animals have nucleus, cytoplasm and cell membrane.
5. Under electron microscope cell can be studied in detail.
6. All cells after growth divide by cell division.
7. There are special regions in the body of organisms where cell division occurs.
8. Multicellular organisms have special cells for doing special functions.
9. By cell differentiations cells become different to do special functions.
10. A group of cells similar in structure and function is a tissue.
11. Let us study the table.

Animal tissues

	Animal tissues	Functions
1.	Epithelial tissue	Protects surfaces, forms lining, becomes secretory.
2.	Connective tissue	Connects body organs, forms packing around organs. It forms frame work of the body.
3.	Muscle tissue	Brings about movement in body and body organs.
4.	Nerve tissue	Conducts impulses and co-ordinates body functions.

Plant tissues

	Functions
Meristematic tissue	Actively involved in cell division, helps in active growth of plant body.
Permanent tissues :	
1. Parenchyma	Helps in storing food. It contains chlorophyll, then helps in synthesis of food by photosynthesis.
2. Collenchyma	Supporting tissue in the young green shoots of plants.
3. Sclerenchyma	Gives mechanical strength to the plant.
4. Xylem	Conducts water and minerals from roots to different parts of the plant.
5. Phloem	Conducts synthesized food from leaves to other parts of the plant.

12. Different group of tissues form organs in living organisms. Stomach, liver, kidneys etc. are organs in animals. Roots, stem, leaves etc., are organs in plants.
13. Different organs form different organ systems.
14. Different organ systems form an organism.

1. There is a jumbled group of tissues, organs, organ systems and organisms:

Excretory system, parenchyma, paramecium, Cartilage, Human being, Lungs, Voluntary muscle fibres, Digestive system, Bone, Leaf, Reproductive system, A rose plant, A neuron, Heart, Conducting system, Stomach, Brain.

Tissues	Organs	Organ system	Organisms

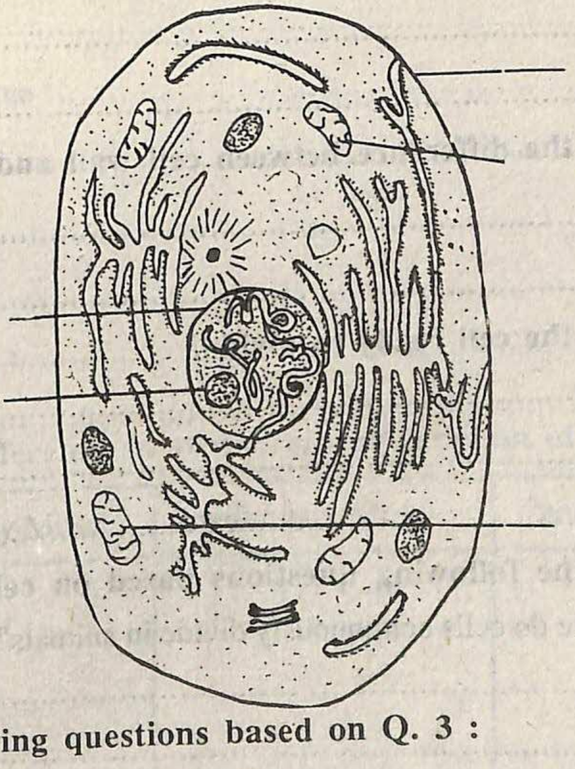
2. Match the following:

Robert Hook	Cell wall
Amoeba	Nose tip
Leeuwenhoek	Invented Crude microscope
Plant Cell	Named Cell
Cartilage	functions under animals will
Ribosomes	unicellular
Striated Muscles	protein synthesis

3. List all the major differences between plant and animal cell.

Plant Cell	*Animal Cell*
....	....
....	....
....	....

Label the parts of the Cell (only the marked ones)



4. Answer the following questions based on Q. 3 :

(i) What is the function of mitochondria?

....

....

(ii) What are the granules present in the cyloplasm of the cell for?

....

....

(iii) How does nucleus help a Cell ?

....

....

(iv) What pigment does chloroplast contain ?

....

....

(v) How many chromosomes are there in a human nucleus ?

....

....

5. What is the difference between cell wall and cell membrane?

....

....

6. When is the cell ready to divide?

....

....

....

7. Answer the following questions based on cell division:

(i) Where do cells continuously divide in animals?

....

....

(ii) What is the specific point of cell division in plants?

....

....

(iii) What happens if the cells continue to divide, when they are not supposed to be dividing?

....

....

8. Define the following:

(i) Cell differentiation : ....

....

(ii) Tissues : ....

....

(iii) Involuntary muscle fibres : ....

....

....

(iv) Meristemetic tissue : ....

....

....

(v) System : ....

....

....

9. Give the major difference in structure and function of :

	Voluntary Muscle	Involuntary Muscle	Cardiac Muscle
Structure			

	Voluntary Muscle	Involuntary Muscle	Cardiac Muscle
Where are they present			
Function			

10. Where would you look for the following tissues?
R.B.C., Collenchyma Cells, sclerenchyma tissues, Nervous, epithelial tissues; parenchyma, Cartilage, meristematic.

1. .... 2. ....
3. .... 4. ....
5. .... 6. ....
7. .... 8. ....

11. Answer the following:

(i) Which system deals with the outer covering of the Human body ?

....

(ii) What system do cartilage and bone comprise of ?

....

(iii) What are conducting tissues ? Name the types of conducting tissues you know.

....

(iv) Name an animal that has exoskeleton.

....

(v) Which system is involved with the exchange of gases ?

....

(vi) Name the system that circulates the useful and the waste materials in the human body.

....

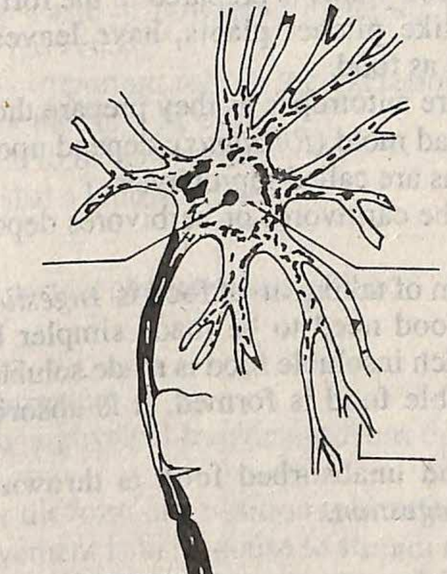
....

(vii) What is a dermal system ?

....

....

12. Label the different parts of a nerve cell in the following diagram :



CHAPTER 14

LIFE PROCESSES I

1. All living organisms carry on life processes.
2. All living organisms require energy to carry on life process.

Food and Nutrition

1. The living organisms get energy from food.
2. Green plants carry on photosynthesis to prepare their own food from the raw materials CO_2 and H_2O.
3. Food in the green plants is prepared in the form of starch.
4. Some plants like pitcher plants, have leaves so developed that they capture insects as food.
5. Green plants are autotrophs as they prepare their own food.
6. Plants like bread mold (*Rhizopus*) depend upon dead and decayed food. Such organisms are called saprophytes.
7. Animals may be carnivores or herbivores depending upon the kind of food they eat.
8. The mechanism of taking in of food is *Ingestion.*
9. All ingested food need to be made simpler by use of enzymes. The process by which insoluble food is made soluble is digestion.
10. Once the soluble food is formed, it is absorbed, the process is called absorption.
11. Undigested and unabsorbed food is thrown out of the body by the process called *egestion..*

Respiration

1. The process of taking in of oxygen and giving out of CO_2 is breathing.
2. Different organisms have different ways of taking in O_2 and giving out CO_2.
3. Oxygen taken in is used for oxidation of food to release energy.
   The energy released is then made available to cells in usable form.
4. Oxidation of food takes place in all living cells whether unicellular organisms or multicellular organism.
5. The process of oxidation of food to release energy is *respiration.*
6. There are organisms which oxidize food in the absence of oxygen. Such organisms are said to respire *anaerobically*. These oxidize food in the presence of oxygen are said to respire *aerobically*.

7. The organs involved in breathing in human beings are nose, trachea and lungs.

Transport System in Living Organisms.

1. All useful materials like food, oxygen need to reach the cells for activities.
2. There are developed transport systems in different animals.
3. In human beings heart pumps blood carrying various materials through blood vessels to different parts of the body.
4. Plants too have a transport system.

Excretion

1. As a result of various life activities going on, waste materials are formed in the body.
2. The removal of the waste or unwanted materials from the body of the organisms is called *Excretion.*
3. Kidneys play a very important role in the excretion of *ammonium salts* dissolved in water in the form of urine.
4. Plants too have waste to be thrown out.
5. Removal of CO_2 is also a kind of excretion.

Movement

1. Movement is an important characteristic of life.
2. Movement may be
   (i) Locomotion
   (ii) Movement of Curvature.
3. Animals often show a physical movement from one place to another is called *Locomotion.*
4. Plants often bend or tilt from one position to another called movement of curvature. The movement is in response to stimuli called Taxis.
5. Mode of movement varies from organism to organism.

Co-ordination

1. All living organisms function in a very well co-ordinated manner, within their body or with the environment.
2. Animals have well developed organs like Brain, Spinal Cord and nerves which bring about co-ordination.
   Some animals may only have receptor cells helping to perform the function.
3. Plants bring about co-ordination with the help of specific chemical substances called growth regulators.

1. Name the basic life processes.

....

....

2. What does a living organism get from food?

....

....

3. Answer the following questions based on photosynthesis:

(a) What are the requirements of a plant to carry on photosynthesis ?

....

(b) Complete this equation :

$$\underset{\text{Carbon dioxide}}{6\,CO_2} + \underset{\text{Water}}{6H_2O} \xrightarrow[?]{?} \underset{?}{C_6H_{12}O_6} + \underset{\text{Oxygen}}{6O_2}$$

(c) Define photosynthesis.

....

....

(d) Name the opening present on the leaf surface.

....

(e) What is the O_2 used for which is given out during photosynthesis?

....

(f) Name a plant that has patches (yellow, red) on it.

....

(g) How do you kill a leaf?

....

(h) What do you use to remove the chlorophyll from the leaf?

....

(i) Why does leaf boiled in alcohol when put in iodine turns blue black?

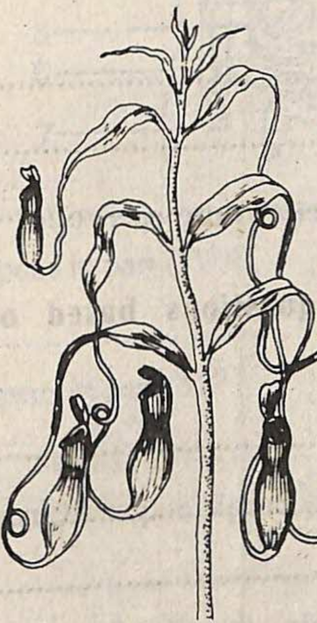
....

4. Rhizopus, mushrooms lack chlorophyll how do they get food?

....

....

5. Answer the questions based on this figure:



(a) What part of the plant has become pitcher like?

....

(b) Why are these plants called insectivores?

....

6. Given below is a list of organisms in a tabular form. Fill in the table correctly:

18. Where does harmful nitrogenous matter change into harmless urea.

....

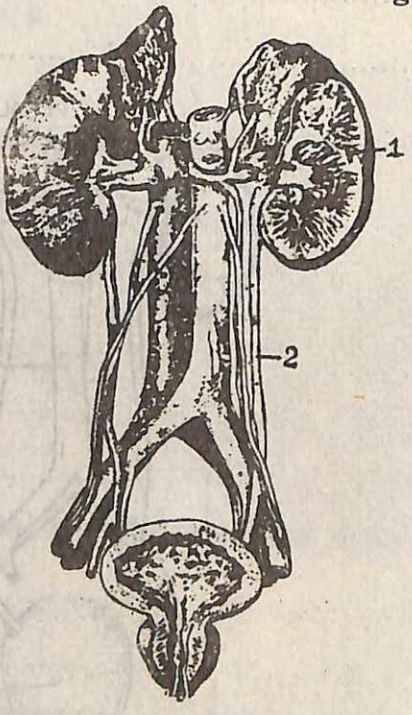
....

19. In what form does urea get out of your body?

....

....

20. Label the figure, and answer the following questions:



(i) What happens in 1 ?

....

(ii) What is 2 for ?

....

21. In what forms are wastes thrown out of plants?

....

....

22. Answer the following questions based on movement:

(a) What is the difference between locomotion and movement of curvature ?

....

....

(b) What happens:

(i) when your heart is beating.

....

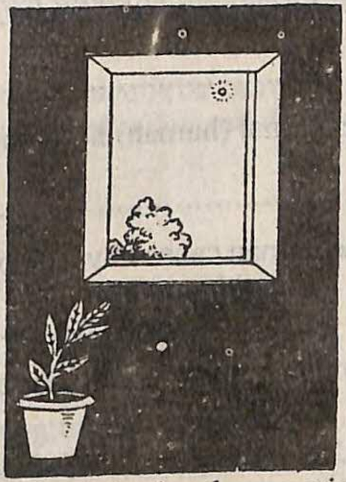
(ii) when you touch the leaves of touch me not.

....

(iii) when food reaches stomach.

....

(c) What does this figure show you ?



(d) What are responsible for bringing locomotion in the following? Name the kind of locomotion seen.

(i) Human being ....

(ii) Snake ....

(iii) Birds ....

(iv) Fish ....

9. Complete this equation, and balance it:

$C_6H_{12}O_6 + O_2 \dashrightarrow CO_2 + H_2O + ?$

What process does this equation show?

10. Define the following terms:

Breathing

....

Aerobic Respiration

....

Anaerobic Respiration

....

11. Where does exchange of gases take place ?

(a) In man : ....

(b) Amoeba : ....

(c) Earthworm : ....

(d) Fish : ....

(e) Cockroach : ....

12. What is the normal breathing rate in man?

....

....

13. Answer the following questions based on human heart:

(i) Where is heart located in your body ?

....

(ii) What is the covering called that protects the heart?

....

(iii) Name the muscles, heart is made up of ?

....

(iv) What is the size of the heart ?

....

14. Name the vessels which carry the blood.

....

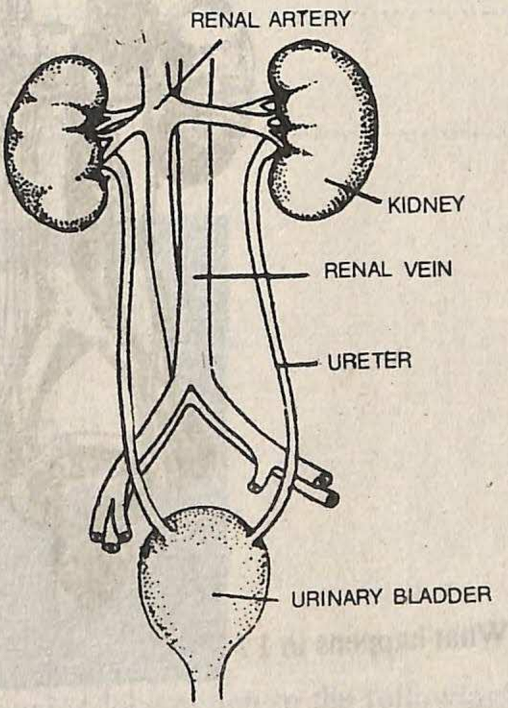
....

15. What is formed where the arteries and vein unite?

....

....

16.



What does this picture show?

....

....

17. Name the system involved in the removal of waste from the body.

....

(e) Define Taxis.

....

(f) What is photo taxis ?

....

23. Answer the following questions based on co-ordination in plants and animals.

(a) Name the systems involved in bringing about co-ordination in man.

....

(b) What are the cells called which pick up stimulus in man ?

....

(c) Name any three endocrine glands.

(i) ....

(ii) ....

(iii) ....

(d) Name any one animal (human) hormone.

....

(e) Name a disease in man caused by lack of a hormone.

....

(f) What are responsible for bringing out co-ordination in man ?

....

(g) Name a plant harmone. Where is it released from ?

....

(h) Define phototropism ?

....

☐ ☐

CHAPTER 15

LIFE PROCESSES II

Reproduction

1. All organisms reproduce to maintain the continuity of its kind.
2. Reproduction may be
   (i) Asexual Reproduction
   (ii) Sexual Reproduction.
3. Organisms when reproduce from any body part, or a cell into a new individual it is said to be *asexual reproduction.*
4. Plants too reproduce from their plant parts as leaf, root, a stem. Such reproduction is *vegetative reproduction.*
5. Animals and plants reproduce, when the male cell (gamete) fuse with the female cell (egg or ovum). Such a process of reproduction is called *sexual reproduction.*
6. The process of sexual reproduction varies in different organism.

Growth

1. All living organisms—unicellular or multicellular—grow in size.
2. There are five phases involved in cell development:
   (i) Cell division
   (ii) Cell elongation
   (iii) Cell movement
   (iv) Cell differentiation
   (v) Cell death.
3. There are remarkable, irreversible changes occur during growth.
4. Plants grow indefinitely.
5. Animals stop growing much before death.
6. All organisms show a process of growth and development.

1. Answer the following questions based on reproduction in plants and animals :

(a) Name the vegetative parts of a plant.

1. .... 2. ....

3. ....

(b) What type of reproduction take place in

(i) Yeast ....

(ii) Potato ....

(iii) Rose flower ....

(c) What is the type of reproduction called where the vegetative parts of the plant are involved?

....

2. Mention the type of vegetative reproduction in the following cases:

(a) When potato is put under the ground for growth.

....

(b) When rose plant cuttings are planted during the rainy seasons.

....

(c) You may have seen that money plant twigs automatically give rise to a bushy plant covering the pot. What is this type ?

....

3. When no sex is involved in increasing the number of progeny, what is such a type of reproduction called?

....

4. Name the different types of asexual reproduction:

(a) ....

(b) ....

(c) ....

(d) ....

5. (a) What do you call a phenomenon, when a lost part is reformed in a organism?

....

(b) **Does this happen in living organism? Where? Give *two* examples?**

....

....

6. **Match the words of the Column *A* with those of Column *B* by drawing lines:**

Column A	*Column B*
1. Budding	Having both sexes
2. Multiple fission	Amoeba
3. Hermaphrodite	Malarial parasite
4. Binary fission	Spirogyra
5. Fragmentation	Earthworm
6. Regeneration	Hydra

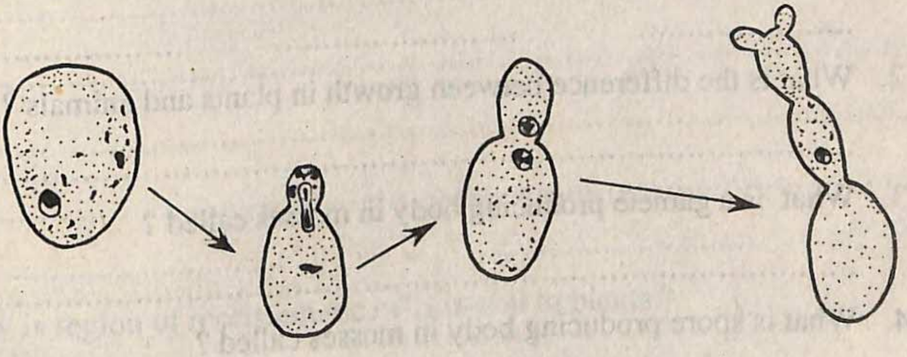
7. **What kind of process of reproduction is involved in:**

(i) Grass..................... (ii) Ginger..........................

(iii) Potato.................... (iv) Bryophyllum..................

(v) Banana.................... (vi) Yeast...........................

8. **What do the following diagram represent?**



9. (i) Where are sperms formed in man?

....

(ii) What happens in fallopian tube ?

....

(iii) Where is an ovum formed in human beings ?

....

10. What is the difference between getting bigger and growing?

....

....

11. What is pollination?

....

....

12. What is fertilization?

....

....

13. Answer the following questions based on growth and development:

1. Name the different phases involved in cell development:

   ....

   ....

2. What is the difference between growth in plants and animals ?

   ....

3. What is a gamete producing body in mosses called ?

   ....

4. What is spore producing body in mosses called ?

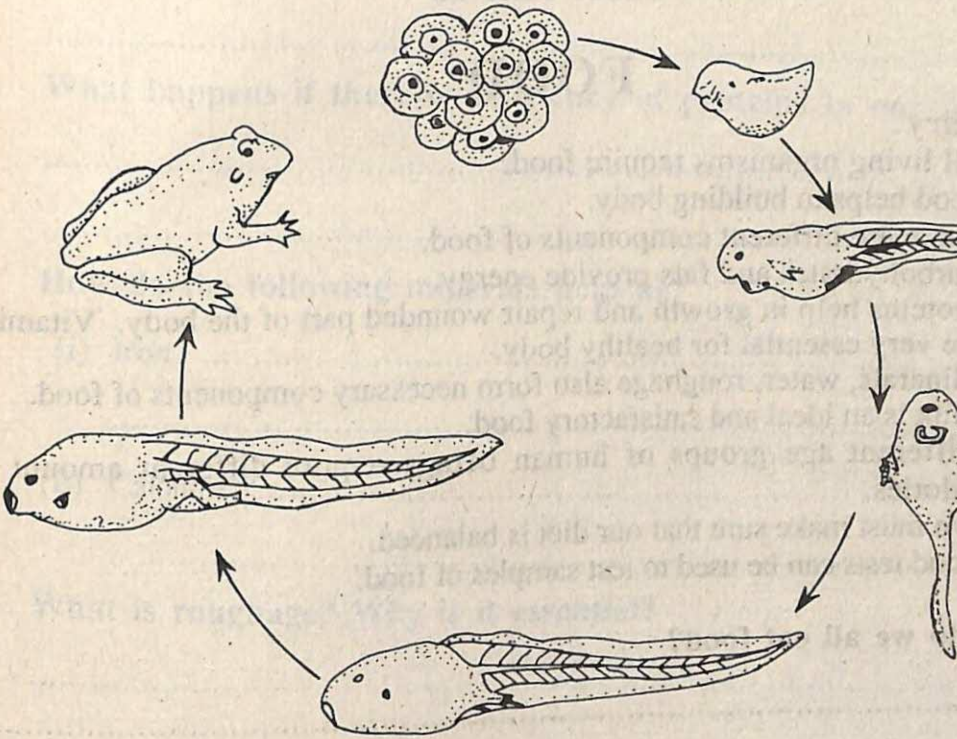
   ....

5. What phenomenon is involved in the development of ferns and mosses ?

   ....

6. Name any two animals showing the phenomenon of metamorphosis-other than frog.

7. Observe the life cycle of frog. The young tadpole is very much different from an adult frog. So it has to undergo lot of changes to become an adult. What is that process called ?



....

....

....

....

1. .... 2. ....

8. How is region of meristematic cells useful to plants ?

....

9. What helps fungus to reproduce ?

....

10. Define a larva.

....

CHAPTER 16

FOOD

Summary

1. All living organisms require food.
2. Food helps in building body.
3. There are different components of food.
4. Carbohydrates and fats provide energy.
5. Proteins help in growth and repair wounded part of the body. Vitamins are very essential for healthy body.
6. Minerals, water, roughage also form necessary components of food.
7. Milk is an ideal and satisfactory food.
8. Different age groups of human beings require different amount of calories.
9. We must make sure that our diet is balanced.
10. Food tests can be used to test samples of food.

1. Why do we all eat food?

....

....

2. Name two autotrophs and two heterotrophs:

Autotrophs 1. .... 2. ....

Heterotrophs 1. .... 2. ....

3. Define a calorie.

....

....

4. Why should there be enough carbohydrates in your food?

....

....

5. **How does fat in our food help us?**

....

....

6. **What happens if there is deficiency of proteins in our food?**

....

....

7. **How do the following minerals help us?**

(i) Iron : ....

....

(ii) Calcium : ....

....

8. **What is roughage? Why is it essential?**

....

....

9. **What would happen, if your food lacks the following vitamin:**

Vitamin A : ....

Vitamin B : ....

Vitamin C : ....

10. **What happens if your food lacks:**

Calcium : ....

....

Iron : ....

....

11. **Name the sources of food you get:**

(i) Iron : ....

(ii) Calcium : ....

(iii) Vitamin C : ....

(iv) Vitamin B : ....

(v) Vitamin A : ....

(vi) Roughage : ....

(vii) Proteins : ....

12. What is a balanced diet?

....

....

13. What is the best food for a baby?

....

....

14. How would you test for the presence of:

(i) Starch in your food : ....

....

(ii) Sugar in your food : ....

....

15. Why it is essential to know food tests.

....

....

□ □

CHAPTER 17

HEALTH AND DISEASE

1. Good health involves all the organs of the body working properly. It involves feeling well in mind and body.
2. Clean food and water keep a body healthy.
3. There are different ways of preserving food, milk and keeping it hygienic for maintaining healthy body.
4. To keep the body healthy, we must take care of hygiene and sanitation.
5. Bacteria, mosquitoes and other micro-organisms cause disease, by contaminating food and water.
6. Diseases by micro-organisms can be caused by air or by direct contact.
7. Diseases are categorised as communicable and non-communicable.
8. Good habits can help in keeping healthy body.

1. What is a healthy body?

....

....

2. When is a body diseased?

....

....

3. What are the ways by which your body can be diseased?

....

....

4. What is safe water?

....

....

5. Why should you not let water puddles near your school or house?

....

[illegible]

....

6. Why is it harmful to *smoke*?

....

....

7. Why should you always wash your fruits and vegetables with clean water before eating?

....

....

8. What is sewage?

....

....

9. Name three diseases caused by infected food and water:

   1. ....
   2. ....
   3. ....

10. Name the different ways, by which the food is kept safe in your house.

....

....

11. How do the following help in keeping food safe:

Cooking: ....

Refrigeration : ....

Adding plenty of sugar: ....

Drying: ....

12. What is malnutrition?

....

....

13. List the different ways by which you can take care of your personal hygiene.

....

....

14. Explain, how is the sanitation can be maintained in

Your school: ....

....

....

Your house: ....

....

....

Around your house: ....

....

....

15. Make a list of five non-communicable diseases and give their symptoms:

Names of Non-Communicable diseases	Symptoms

16. Make a list of diseases caused by:

Virus ....

Bacteria ....

Mosquitoes ....

Protozoans ....

17. Make a list of diseases you have taken vaccination for:

....

....

....

☐ ☐

CHAPTER 18

SOILS

Summary

1. The land surface of the earth is covered with soil.
2. Soil is formed by splitting and breaking of the rocks.
3. Wind, rainwater, heat, and acid help in breaking of rocks.
4. The soil components are humus, minerals, air, water and micro-organisms and other living organisms.
5. There are different types of soils, but loam is the best soil for the growth of plants.
6. There are different layers of the soils — Top soil, Sub-soil and Rocky layer.
7. Top soil is the best soil and it needs to be conserved by reforestation, regrassing, by phoughing, by terracing and adding fertilizers.
8. Cutting of trees, heavy floods, rains, winds, grazing expose the top soil to be carried away. The loss of top soil is soil erosion.
9. Defaecation in the open fields and industrial waste on the fields pollutes the soil. This is harmful for the life on the soil.

1. Answer the following questions:

(i) Where does soil come from?

....

....

(ii) How do the following help in soil formation:

(a) Heat of the sun: ....

....

(b) Rain water: ....

....

(c) Roots of the plant: ....

....

(iii) What does the colour of the soil depend upon?

....

(iv) What is sedimentation list?

....

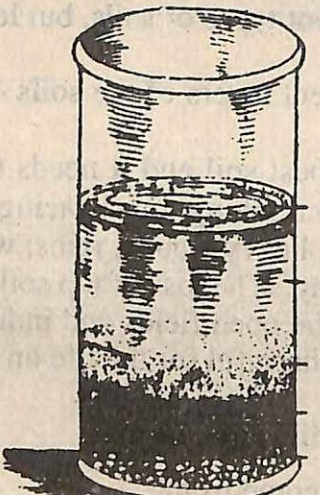
....

(v) What does sedimentation test help in?

....

....

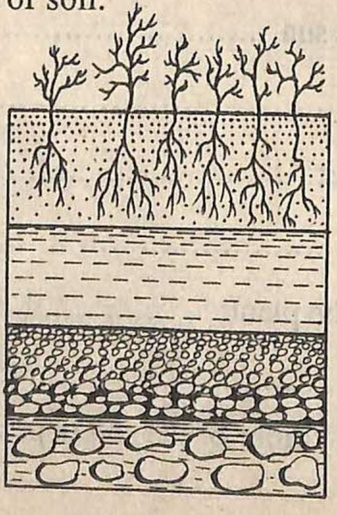
(vi) Label the different components of the soil.



(vii) Give the percentage composition of the Loam.

....

(viii) Label the different layers of soil.



(ix) How does humus help?

....

....

(x) If garden has sandy soil, what would you add to make the soil better for growing plant.

....

....

(xi) Why is clay soil not considered good for plant growth?

....

....

(xii) 'Soil is a natural resource.' Comment.

....

....

(xiii) Why is top soil considered best for plant growth?

....

....

2. What happens to bare soil when it rains?

....

....

3. To hold soil, we should (mark the correct one):

(a) cut down trees.
(b) plant trees.
(c) permit leaves to remain on the forest floor.
(d) remove the leaves from the forest floor.
(e) permit plant roots to remain in the ground.
(f) dig up the plant roots.

4. Define the following:

(i) Reforestration

....

(ii) Regrassing

....

5. What is Soil Conservation?

....

....

6. Explain the different ways the soil can be conserved.

....

....

7. How does a farmer conserve the top soil?

....

....

8. What is soil pollution?

....

....

9. What are the ways of maintaining the hygiene of the soil?

....

....

10. What does the good crops depend upon?

....

....

11. Find examples of soil erosion around your home and school.

....

....

12. Why are the colours of the soil

Red ....

Black ....

13. Why is desert soil porous?

....

....

14. What types of soil are formed in:

1. Maharashtra ....
2. West Bengal ....
3. Rajasthan ....
4. Gujarat ....
5. Interior of Tamil Nadu ....
6. Uttar Pradesh ....

15. What do you know about?

1. Laterite type of soil ....

....

2. Black soil ....

....

3. Alluvial soil ....

....

☐ ☐

CHAPTER 19

AGRICULTURAL PRACTICES AND IMPLEMENTS

1. Plants and animals directly useful to us need to be managed by us.
2. There are plants and animals managed by nature in jungles, forests, oceans etc.
3. Man has improved agricultural practices. The improvement is still continuing.
4. Crop rotation restores the lost fertility of plants.
5. Transplantation allows better growth of plants.
6. Fungicides and pesticides are sprayed on the plants to protect them from some diseases.
7. Good soil (Loam) need to be used for the plants.
8. Soil is the only source of mineral nutrition for the plants.
9. Irrigation facilities need to be improved to get better yield from the plants.
10. Drainage system should be good, to prevent stagnation of water.
11. Good care should be taken while sowing the seeds.
12. Harvesting, thrashing and winnowing are the practices when the grains are fully mature.
13. Grains need to be stored very efficiently.
14. Crop plants can grow better, if soil, irrigation, protection and seeds are taken good care of.
15. Man has domesticated animals from very very long.
16. Animals we need care of :
    (i) Milk giving animals.
    (ii) Meat and eggs giving animals.
    (iii) Draught or working animals.
17. Our demand can only be met by improving the live stock.
18. Proper care and management are required for improvement of live stock.
19. Domesticated animals are also victims of various diseases. Animals should be given vaccination at young ages.
20. Many other kind of animals like honey bees, silk moths, and fishes are also managed by us for various purposes.

1. What is cultivation?

....

....

2. How do the following help in improving the soil:

(i) Liming ....

....

(ii) Tilling ....

....

3. What is crop rotation? How does it help in improving the cultivation of crop?

....

....

4. What is transplanting? In what crop it is practised?

....

....

5. How does transplanting help in improving the crop?

....

....

6. What does the requirement of irrigation for the crop depend upon?

....

....

7. Complete the table:
Give the names of

No.	*Weed killers*	*Pesticides*	*Insecticides*
1.			
2.			
3.			

8. **What do you know about**

Harvesting ....

Thrashing ....

Winnowing ....

9. **How should we store the grains?**

....

....

10. **Name the different varieties of wheat.**

....

....

11. **Name the good varieties of rice.**

....

....

12. **What do you understand by:**

(i) Hybridization ....

....

(ii) Breeding ....

....

13. **List the different ways of improving irrigation systems.**

....

....

14. **How do lizards, snakes help in protecting plants? What is this kind of control called?**

....

....

15. Make a list of animals domesticated by us.

....

....

16. Write a note on animal husbandry.

....

....

17. What are the handicaps in animal husbandry? Make a list.

....

....

18. What kind of a house a cattle should be housed in?

....

....

19. Give an account of the food and feeding habits of:

(i) Cattle ....

....

(ii) Sheep ....

....

(iii) Pig ....

....

20. What are the products we depend upon from:

(i) Ducks and hen

....

(ii) Sheep and goat

....

(iii) Cows and buffaloes

....

21. Make a list of diseases, domesticated animals suffer from.

1. ....

2. ....

3. ....

4. ....

5. ....

22. How should we take care our domesticated animals to get the best out of them?

....

....

23. Why it is not proper to house the animals in overcrowded place?

....

....

24. What is mash diet?

....

....

25. Where and why are the following reared?

Honey bees:

....

....

Silk moths:

....

....

Fish:

....

....

☐ ☐